

# HORTICULTURAL ABSTRACTS

Initialled abstracts and reviews not by Bureau staff are by A. E. Bradfield, A. E. Flood, H. B. S. Montgomery, S. C. Pearce of the East Malling Research Station, the staff of the Obstbauversuchsring, Jork, Germany [O.J.] and H. Wormald.

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## MISCELLANEOUS.

### General.

1428. HUDSON, C. E.

Experimental horticulture stations.

*Agriculture, Lond.*, 1952/53, 59: 424-7, 516-20.\*

Brief notes are given in the first article on the location and broad purpose of the following National Agricultural Advisory Service (N.A.A.S.) farms. Efford Farm, Lymington, Hants.—chiefly fruit, vegetables, glasshouse crops and flowers; Fairfield Farm, Esprick, near Kirkham, Lancs.—glasshouse crops, flowers and soft fruit; Luddington Manor Farm, Stratford-on-Avon, Warwickshire—fruit, vegetables and crops in frames; Rosewarne Farm, Camborne, Cornwall—early spring vegetables, flowers and bulbs; Stockbridge House Farm, Selby, Yorks.—vegetables, rhubarb and soft fruit cultivation under dutch lights. The management and initiation of experimental work at these stations is discussed. In the second article notes are given of the actual work in progress in the different fields covered by the various stations. In fruit, long-term experiments are planned at all the main stations on rootstocks, pruning, nutrition and soil management of apples, pears and plums, and on a range of soft fruits, and there will be investigations on diseases and pests and machinery. Each station will also pay attention to problems of local importance, e.g. a cropping test of damsons for

hedgerow planting and windbreaks at Stockbridge. Glasshouse work has proceeded most rapidly at Fairfield, and both there and at Stockbridge problems of ventilation, humidity, light, etc., will be under observation. Flower crop plans will gradually develop at Rosewarne and the existing centre, Kirton, in Lincolnshire. As regards vegetables, lines developed most actively so far have included the varietal and strain trials of vegetables in conjunction with the N.I.A.B. at Cambridge and the experiments on chemical weed control in conjunction with the Unit of Experimental Agronomy at Oxford.

1429. PEARSON, C. E.

The post-war pattern of horticulture in England and Wales.

*Agriculture, Lond.*, 1953, 59: 508-15.

A most useful article to the economist showing trends and the reasons for them. The author discusses past, present and foreseeable acreages of vegetables, glasshouse crops, flowers and bulbs, top fruits and soft fruits. To achieve his desired ends, namely the production and sale of a high proportion of high quality goods, the grower must maintain soil fertility, and make full use of irrigation, storage and pest and disease control equipment, all of which are costly. At present to meet foreseeable demands the total acreage necessary would appear to be some 600,000 made up of 250,000 acres top fruits, 45,000 soft fruit, 280,000 vegetables,

\* See also *J. roy. agric. Soc.*, 112: 45-9; *H.A.*, 22: 2033.



5,200 glass, and 24,000 acres flowers, bulbs and nursery stock. Whereas the total, less than the peak of 1948, would be about the same as before the war, it is reckoned that production would be 35% higher.

1430. CRAMP, K. V.

**Horticulture in the East Anglian Fens.**

*A.R. hort. Educ. Ass.*, 1951, 1952, pp. 86-91.

After a brief description of the fens as a whole notes are given on horticulture and its problems in the true black fens, including long-cultivated and recently reclaimed areas. Crops which give excellent results on black fens long under cultivation are peas for canning and drying, carrots and celery. Experimental results on newly reclaimed land are then given. Crops generally successful were cabbage, savoy, carrot, red beet, turnip, spinach beet, lettuce, marrow, dwarf bean, parsley, rhubarb, annual flowers, sunflowers and strawberries for runner production. Crops successful at some but not at other centres (probably due to variation in soils, situation and management) were onion, chicory, radish, summer pea, cucumber, parsnip, leek, sweet corn, cauliflower, brussels sprouts, broccoli, chrysanthemum, scabious, pyrethrum, narcissus and gladiolus. Crops which failed at all centres were tomato, melon and black currant.

1431. BREVIGLIERI, N.

I lavori del congresso internazionale di orticoltura. (The 13th International Horticultural Congress, London, 8th-15th September, 1952.)

*Riv. Ortoflorofruttic.*, 1952, 36: 207-34, illus.

The high lights of the conference with copious and excellent illustrations are displayed to the Italian reader.

1432. REID, I. G., AND BENNETT, L. G.

**Labour efficiency in horticulture.**

*Fruitgrower*, 1952, No. 2967, pp. 841-2, and No. 2969, pp. 945-7, illus.

The authors, who are members of the Department of Agricultural Economics at Reading University, show that considerable economies in labour utilization can be effected in both large and small horticultural enterprises by improvement in (1) team work, (2) work methods, (3) use of tools and equipment, and (4) lay-out of place of work.

1433. ALVAREZ, V.

Dirección de estaciones experimentales. (The agricultural experimental stations [in Cuba].) *Rev. Agric.*, Habana, 1951/52, 35 (1): 56-77, illus.

A brief outline is given of the organization, development and work of the 4 government agricultural research centres in Cuba: (1) The Estación Experimental Agronómica, Santiago de las Vegas, founded in 1905, and its 2 recently established sub-stations. The research programme includes general studies on agricultural crops and tobacco, testing varieties of avocado, mango, citrus, vegetables and ornamentals, pest and disease control investigations, and the introduction of medicinal plants. Until recently sugar cane was also covered by this station. (2) The Estación Experimental del Café y Cacao, Jiguani, founded in 1939, and its 5 new sub-stations. (3) The Estación Experimental de la

Caña de Azúcar, Jovellanos, founded in 1945. The main projects are breeding of sugar cane, biological control of sugar cane borer, and manuring and irrigation studies. (4) Comisión de Fibras, Santiago de las Vegas. This Fibre Commission was established in 1943 to investigate the possibility of producing fibre for the manufacture of sugar cane sacks. Most attention has been given to the cultivation of kenaf.

1434. FJÄDERHANE, A. M.

**Arbetsstudier i trädgårdsodlingen. (Time studies in horticulture.)**

*Medd. Alnarpsinst. Trädgårdsavd. drifts-ekon. Byrån* 6, 1951, pp. 94 and 10, 1952, pp. 114.

These two communications in large format are an elaborate attempt to introduce time studies into horticulture. On behalf of the Bureau of Horticultural Economics, Alnarp, students visited market gardens to time a large variety of operations, ranging from the pinching out of tomatoes to the digging of graves in cemeteries. The data collected were then prepared for publication by the author, who is director of the Bureau. In each case the exact conditions, under which the operation was carried out, are described. Often, the same operation was studied in more than one market garden and the reader cannot fail to be impressed by the difficulties of standardizing labour in horticulture. For a workman's performance—for instance the number of tomato plants he ties up per hour—is determined by a host of factors, including the effect which different temperatures in the glasshouse have on him, without even taking individual skill and industry into account. The figures also emphasize the importance of a suitable layout and of intelligent planning in relation to a worker's performance. Employers of horticultural labour may well be grateful for this new line of research. Some work on fruit trees is also recorded, but for a detailed time study in fruit growing see abstract 1515.

1435. TURRILL, W. B.

**Methods of the experimental ground in relation to taxonomy.**

*Kew Bull.*, 1952, No. 3, pp. 427-37.

The author discusses from his own experience experimental methods that can be used in plant taxonomy to supplement herbarium and other methods. The general methods involve planning, the collection of material, labelling, the care of "transplants", recording qualitative and quantitative characters on scoring sheets and harvesting specimens for record purposes. In addition, the application to taxonomy of both ecological and genetical experiments is considered.

*Statistical design.*

1436. MOORE, J. F.

**A study of field plot technique with sprouting broccoli.**

*Proc. Amer. Soc. hort. Sci.*, 1952, 59: 471-4, bibl. 5, being *Sci. Pap. Wash. St. agric. Exp. Stats* 994.

A study was made of variability for plots of different sizes using a method similar to that of Fairfield Smith. In order to show a significant difference of 10% between varietal means, it is recommended that five replicates



be used of 100-plant plots. The coefficient of variability for individual plants was 43.29%. S.C.P.

1437. KEULS, M.

The use of the "studentized range" in connexion with an analysis of variance.

[Dutch summary 7 lines.]

*Euphytica*, 1952, 1: 112-22, bibl. 8.

A numerical example is given of the analysis of variance applied to yields of cabbage. An F-test will indicate whether the varieties show significant differences, and a t-test is then usually applied to determine which varieties differ. It is pointed out that, when the trial involves more than 2 varieties, the t-test will not give valid results. A new, more satisfactory method is suggested.—Inst. hort. Plant Breed., Wageningen.

1438. PIJLS, F. W. G., AND VAN DER BOON, J.  
Een bemestingsonderzoek bij appel, druif en tomaat volgens de proefplekkenmethode. (A manurial investigation with apples, grapes and tomatoes using the sample-spot method.) [English summary  $\frac{1}{2}$  p.]  
*Meded. Dir. Tuinb.*, 1952, 15: 674-92, bibl. 15.

A manurial trial was carried out to determine the relationship between yield and soil analysis, with a view to establishing a better basis for manurial recommendations. The test plants were the apple variety Jonathan on M.XVI rootstock, the grape variety Black Alicante on its own roots, and a tomato variety of the Tuckwood type. For each crop the relationship was determined between (a) the chemical composition of the foliage and chemical and physical properties of the soil, (b) the yield and the chemical composition of the foliage, and (c) the yield and the chemical and physical properties of the soil. It is concluded that the great number of variable factors makes the application of the sample-spot method difficult. The main requirement is that the yielding capacity of a crop at a specific sample spot can be easily assessed. The amount of any element contained in the foliage is determined by the concentration of other elements in the soil solution and by physical soil properties, as well as by the amount of that element available in the soil.

### Meteorology.

(See also 1596, 2376.)

1439. WITTERSTEIN, F.

Untersuchungen an der langen phänologischen Beobachtungsreihe von Geisenheim. (Studies on the long series of phenological observations made at Geisenheim.)

*Ber. dtsch. Wetterdienst. U.S. Zone 42*, 1952, pp. 313-20, bibl. 10.

A statistical analysis of the phenological records collected at Geisenheim research station shows that 45 years of observation are required to determine a deviation of  $\pm 1$  day from the mean value over a 51-year period.

1440. UEHARA, M.

Study on the cultivation and utilization of slope farm. VII. Micrometeorological study in spring on the slope farm. [Japanese, English summary 1 p.]

*Tech. Bull. Kagawa agric. Coll.*, 1951, 3: 72-9.

Notes are given on solar radiation, air temperature, air humidity, evaporation and soil temperature in spring. [For previous papers in this series, see *H.A.*, 22: 2050.]

1441. REINDERS, H. R.

The ACG rain-gauge, a simple but practical instrument.

*Weather*, 1952, 7: 388, illus.

A brief note on a simple, direct reading rain-gauge designed for farmers by the Aankoop-Centrale in Groningen, Holland. Sufficient accuracy for practical purposes is claimed.

### Biochemistry.

(See also 1503i, r, t, u, 1627, 2377.)

1442. JENSEN, E.

Rapid procedure for the determination of cobalt in plant material.

*Analyt. chim. Acta*, 1952, 7: 561-6, bibl. 2.

Selective adsorption on a small column of active alumina is utilized in a procedure for the colorimetric determination of cobalt in plant material, using nitroso-R-salt as the colouring agent. The method uses only simple apparatus and is very time-saving. The accuracy is  $\pm 3$  or 4 mg. cobalt per ton of dried plant sample. [Author's summary.]

1443. JOHNSTON, B. R., AND OTHERS.

Determination of potassium in plant materials with a flame photometer.

*J. Ass. off. agric. Chem. Wash.*, 1952, 35: 813-16, bibl. 5, being *J. Art. Mich. agric. Exp. Stat.* 1343.

Potassium concentrations were determined in 13 different plant materials and the percentages of K obtained by the use of a flame photometer were in good agreement with those obtained by the platinum chloride procedure.

1444. SHAW, E.

A dithizone tissue test for zinc in plants.

*Soil Sci.*, 1952, 74: 479-80.

A simple test is proposed for assessing the relative Zn contents of plants and the variations of concentration within different parts of the same plant. It is based on the amount of red Zn dithizonate formed on the application of a small quantity of 0.01% zinc-free dithizone in  $\text{CCl}_4$ —U.S. Dep. Agric.

1445. NOGGLE, G. R., AND ZILL, L. P.

The quantitative analysis of sugars in plant extracts by ion-exchange chromatography.

*Arch. Biochem. Biophys.*, 1952, 41: 21-8, bibl. 11.

The method appears to be especially suitable for the quantitative analysis in plants of sugar mixtures of considerable complexity. Results are given for the analysis of plant samples containing sucrose, raffinose, stachyose, glucose, galactose, and fructose. [From authors' summary.]—Oak Ridge National Laboratory, Tennessee.

1446. WYKES, G. R.

An investigation of the sugars present in the nectar of flowers of various species.

*New Phytol.*, 1952, 51: 210-15, bibl. 14.



Previous research suggested that the individual sugars present contribute to the relative attractiveness of specific nectars to honey bees. The constituent sugars in nectar secreted by flowers of 60 species of 19 families, including many of horticultural value, were determined by paper-partition chromatography. Fructose, glucose and sucrose (which are highly attractive to honey bees) were found in the nectar of all but one species. Maltose and 2 substances which appeared to be melibiose and raffinose (which are not attractive) were found in relatively small quantities in a few species. The constituent sugars and their relative proportions tended to remain constant for any one species and their occurrence appeared to be characteristic for certain families.

1447. RAW, G. R.

**The effect on nectar secretion of removing nectar from flowers.**

*Bee World*, 1953, 34: 23-5, bibl. 7.

In preliminary experiments at Rothamsted in 1949, the total amounts of nectar and sugar secreted by raspberry and blackberry flowers whose nectar was collected more than once were found to be consistently higher than the amounts produced by the controls, but the sugar concentration of the nectar was markedly lower.

1448. DOMAN, N. G., AND OTHERS.

**The diversity of the primary products of photosynthesis in a number of plant species.** [Russian.]

*Doklady Akad. Nauk S.S.S.R.*, 1952, 86: 369-72, bibl. 8.

The amounts of radioactive carbon were determined for 17 species of plants of 12 families at various times during June, July and August. Radio-autographs of the onophoretic analyses of products after 1 sec. exposure of leaves of 7 species of plants, including French bean (*Phaseolus* sp.), *Cyphomandra* [? *C. betacea*, tree tomato] and radish (*Raphanus sativus*), are shown. The results obtained are taken to indicate that the primary products of photosynthesis are not always the same; sometimes they are acid, sometimes neutral.

1449. BENTLEY, L. E.

**Occurrence of malonic acid in plants.**

*Nature*, 1952, 170: 847-8, bibl. 4.

Much of the work was carried out with leaves of runner bean plants.—King's College, Univ. of London.

1450. ANDERSON, D. G., AND OTHERS.

**The distribution in higher plants of triphosphopyridine nucleotide-linked enzyme systems capable of reducing glutathione.**

*Plant Physiol.*, 1952, 27: 675-84, bibl. 21.

A simple test has been described for determining the presence of glutathione reductase in dialysed extracts of higher plants. Application of the test has shown that the enzyme is widely distributed in plant tissues. It was present in soluble form in all of the 15 different sources tested (wheat germ, pea seedlings, spinach leaf, sunflower leaf, *Sedum spectabile* leaf, parsley leaf, tomato leaf, carrot root, parsley root, sweet potato root, potato tuber and the fruits of avocado, cantaloupe, and cucumber). After glutathione reductase has been shown to be present in a particular extract, the presence of any other dehydrogenase requiring triphosphopyridine nucleotide (TPN) in that extract may be determined readily by measurement of the reduction of oxidized

glutathione in the presence of TPN and the substrate of the enzyme for which the test is conducted. Further observations on the widespread distribution of malic enzyme and isocitric dehydrogenase have been made with such coupled systems using the sources listed above. In addition, such a test system has been used to show that the enzyme glucose-6-phosphate dehydrogenase is also widely distributed in the tissues of higher plants. The significance of these findings is discussed. [Authors' summary.]—Northwestern University, Evanston, Illinois.

1451. ARNON, D. I.

**Glyceraldehyde phosphate dehydrogenase of green plants.**

*Science*, 1952, 116: 635-7, bibl. 13.

In relation to the early products of photosynthesis in such plants as spinach and tobacco. [See also M. Gibbs, *Nature*, 1952, 170: 164.]

1452. ICE, C. H., GAGE, T. B., AND WENDER, S. H.

**The use of filter paper pulp in the separation of certain flavonoid compounds.**

*Proc. Okla. Acad. Sci.*, 1951, 1952, 32: 99-100.

The chromatographic method described was found suitable for the separation of a small quantity of a mixture of two flavonol glycosides isolated from leaves of *Vaccinium myrtillus*, but became cumbersome when applied to separations on a large scale.

### *Physiology.*

(See also 1503a, h, 2383.)

1453. DAVIS, E. A.

**Photosynthetic *Chlorella* mutants.**

*Amer. J. Bot.*, 1952, 39: 535-9, bibl. 7.

A method of producing mutants which results in the loss of the ability of the organism to effect the synthesis of essential cellular constituents is being used for the study of photosynthesis. In the first phase of the work 3 *Chlorella* mutants were obtained which require a source of reduced carbon for growth and contain what appears to be normal chlorophyll. Two are unable to photosynthesize and the third evolves oxygen when illuminated. The aim of future work will be to determine in which portion of the photosynthetic mechanism the blocked reactions occur and to associate their inability to photosynthesize with specific deficiencies.—Department of Plant Biology, Stanford, California.

1454. KURSANOV, A. L., KRJUKOVA, N. N., AND VARTAPETJAN, B. B.

**The movement of carbon dioxide in the plant, entering through the roots.** [Russian.]

*Doklady Akad. Nauk S.S.S.R.*, 1952, 85: 913-16, bibl. 12, illus.

Radio-autographs of young bean plants grown in nutrient solutions containing  $\text{Na}_2^{14}\text{CO}_3$  showed the highest concentrations of radioactive carbonate in the roots, in the middle of the stems of plants with a high chlorophyll content, and in the leaf petioles. When, however, the stems of plants were shaded by tin-foil wraps, the carbonate moved up into the leaves, which in fully illuminated plants had possessed the lowest carbonate content.



1455. MOŠKOV, B. S.

The nature of the use of radiant energy by tomato plants in relation to strength of the radiation current and the continuity of daily illumination. [Russian.]

*Doklady Akad. Nauk S.S.S.R.*, 1952, **84**: 369-72.

Data obtained in the course of 24-hour periods with tomato plants indicate that the strength of radiation as well as the time in which its activity is maintained on the plants and the correlation of these two factors determine the use of radiant energy by the plant.

1456. ELLIOTT, B. B., AND LEOPOLD, A. C.

A relationship between photoperiodism and respiration.

*Plant Physiol.*, 1952, **27**: 787-93, bibl. 10, being *J. Pap. Purdue Univ. agric. Exp. Stat.* 547.

A study was made of the metabolic changes, as expressed by respiratory activity, associated with the onset of floral initiation, using short-day, indeterminate, and long-day plants. The respiration rates in leaf discs of long-day plants decreased and those of short-day plants increased with photoinduction, while the activities of indeterminate plants appeared to be related to the total light received. The data presented exhibit a correlation between the extent of changes in respiratory activities and the degree of flowering in response to the first few days of photoperiodic induction. On the basis of the experiments reported, a hypothesis is offered that the photoperiodic mechanism by which flowering is induced involves a respiratory shift.—Purdue University, Lafayette, Indiana.

1457. WAGGONER, P. E., AND SHAW, R. H.

Temperature of potato and tomato leaves.

*Plant Physiol.*, 1952, **27**: 710-24, extensive bibl., being *J. Pap. la agric. Exp. Stat.* J-2028.

The effects of several factors upon leaf temperature were predicted and verified. The factors considered were changes in radiation due to time of day, sky cover, angle of incidence and shading; changes in ventilation due to location on the plant and density of stand; and differences in plant species. A leaf perpendicular to insolation was 3-2° C. warmer than a leaf parallel to insolation. Shaded leaves on all parts of the plant had nearly equal temperatures while leaves exposed to insolation at the top of the plant and near the soil line were 7-8 and 12° C., respectively, warmer than the shaded leaves. Upper exposed leaves were 3-3 to 8° C. warmer on clear days and 0-8° C. cooler on cloudy days than the air temperature in an instrument shelter. At night the same leaves were 0-5° C. cooler than the air in the shelter. Lower sheltered leaves were 0-5 to 0-8° C. cooler during the day than temperatures in an instrument shelter. On a cloudy night lower sheltered leaves were 0-5° C. warmer than the air 1 cm. above them. Air temperatures 1 cm. below an exposed upper leaf were about 1° C. warmer than temperatures in an instrument shelter on a clear, windy day. No temperature differences were observed between similarly exposed potato and tomato leaves or between similarly exposed tomato leaves in open and closed plantings. [From authors' summary.]

1458. KOBEL, H.

Untersuchungen über den Einfluss des Kupfers auf die pflanzliche Transpiration. (Investigations on the effect of copper on the transpiration of plants.)

*Phytopath. Z.*, 1952, **20**: 39-74, bibl. 21, illus.

The effect of copper on plants in relation to its use in plant disease control was studied in experiments on bean plants. The data recorded include results of spraying and immersing leaves in solutions of copper compounds. It was found that when leaves of young plants were sprayed with copper sulphate with a wetting agent, at a concentration of 0-06% or over, transpiration in general decreased but transpiration in the dark increased. The stomata of leaves treated with copper sulphate were wide open both in light and darkness.

1459. WELLENSIEK, S. J.

Problemen rond de bloei. (Problems connected with flowering.) [English summary 1 p.]

*Meded. Dir. Tuinb.*, 1952, **15**: 499-521, bibl. 21, illus., being *Publ. Lab. TuinbPlantent.* 104.

Some of the work carried out at the Laboratory for the Culture of Horticultural Plants, Wageningen, on methods of controlling flowering is discussed, and the following general conclusions are drawn: (1) The division of phases of development must be based on morphological characteristics of the plant and not on the action of growth factors; (2) the action of cold in seed vernalization is fundamentally different from that in plant vernalization; (3) a distinction must be made between the qualitative and the quantitative effects of day length; (4) it is in some cases possible to select annual plants from biennial species. The horticultural applications of control of flowering are reviewed.

1460. O'ROURKE, F. L.

The effect of juvenility on plant propagation.

*Nat. hort. Mag.*, 1952, **31**: 278-82, bibl. 20.

The literature on juvenility and ageing in plants is discussed with particular reference to the rooting of cuttings, the seat of juvenility, the relationship between juvenility and thorniness and rejuvenation by nucellar embryony.

1461. BLOCH, R.

Wound healing in higher plants. II.

*Bot. Rev.*, 1952, **18**: 655-79, bibl. 81.

As a supplement to a previous article [*Ibidem*, 1941, **7**: 110-46; *H.A.*, **12**: 12] in which he reviewed the general phenomena of wound healing in higher plants, the author now reviews the literature of the last decade on organ structure and wound response, the physiological changes associated with wound healing, wound hormones and necrotic changes, and specific problems such as cell division, dedifferentiation and reactivity, differentiation, and atypical growth.

1462. SKELDING, A. D., AND REES, W. J.

An inhibitor of salt absorption in the root tissues of red beet.

*Ann. Bot. Lond.*, 1952, **16**: 513-29, bibl. 12.

The absorption of manganese ions by discs of beetroot tissue occurs in two phases. Evidence suggests that the



first is physical in nature, the second physiological. The interval between the two phases becomes longer as the thickness of the discs is increased and reasons are given for attributing this to the presence of an inhibitor of the physiological absorption process. Aqueous extracts of beetroot contain an inhibitor of ion absorption which also delays the germination of mustard and cress seeds. The extract does not affect the respiration rate of beetroot tissue. [Authors' abstract.]

1463. BERGANN, F.  
Haberlandts *Crataegomespilus*-Studien, ein Beitrag zur Frage der vegetativen Hybridisation. (Haberlandt's *Crataegomespilus* studies, a contribution on the problem of vegetative hybridization.)  
*Züchter*, 1951, 21: 245-53, bibl. 30 [received 1952].

The author comes to the conclusion that Haberlandt's findings and views confirm the existence of vegetative hybridization.

1464. PRAKKEN, R.  
Entproven met tomaat. (Grafting experiments with tomatoes.)  
*Not. Studiekring voor PIVered., Wageningen*, 1951, pp. 442-5, from English abstr. in *Euphytica*, 1952, 1: 154.

In carefully controlled grafting experiments carried out at Wageningen with 2 tomato varieties, no direct influence of stock could be observed on the vegetative characters or heredity of the scions.

1465. SEMENIENKO, G. I.  
Changes in the nucleoprotein content of plants through vegetative hybridization.  
[Russian.]  
*Biohimija*, 1952, 17: 655-9, bibl. 14.

Substantial quantitative changes in the phosphorus nucleoprotein content of young growing organs and tissues of the scion and also of the hybrid progeny are brought about by vegetative hybridization. By grafting tomatoes on eggplants and *vice versa* the change in the phosphorus nucleoprotein content of the leaves is influenced by the rootstock, and this change is enhanced by repeated grafting. The progeny of the vegetative hybrids showed greater hybrid vigour, and increased nucleoprotein content in the leaves, flowers, apex and young shoots than the original forms.

### Polyploidy.

1466. SCHWANITZ, F.  
Einige kritische Bemerkungen zur Methode der Bestimmung der Polyploidie durch Messung der Pollen- und Spaltöffnungsgrösse. (Some critical remarks on the method of identifying polyploidy by measuring the size of pollen and stomata.)  
*Züchter*, 1952, 22: 273-5, bibl. 1, illus.

Pollen grains from freshly-opened flowers were considerably larger than those from flowers that had been open for some time. The size of guard cells and stomata of the same plant was also found to vary greatly, early leaves being generally composed of larger cells than those formed at a later stage. The magnitude of this difference may exceed the difference in cell size associated with chromosome doubling.—Inst. f. Bastfaserforschung, Niedermarsberg, Westfalen.

### Growth substances.

(See also 1490, 1491, 1503k, n, 1520, 1534, 1561-1566, 1588, 1602-1604, section on Weeds and weed control, 1873, 1950, 1952-1955, 1959, 1979 I, 2067m, 2078, 2131, 2172-2174, 2237, 2341, 2386.)

1467. HITCHCOCK, A. E., AND ZIMMERMAN, P. W.  
Response of tomato plants to treatment with 2,4-dichlorophenoxyacetic acid in combination with indoleacetic acid and certain other compounds.  
*Contr. Boyce Thompson Inst.*, 1952, 17: 35-55, bibl. 12, illus.

Responses induced on tomato plants by applying IA in combination with 2,4-D varied according to the morphological position of the treated leaflets and the quantity of 2,4-D and IA applied. Additive effects generally resulted from the use of 1  $\gamma$  2,4-D or less and inhibitive effects with higher doses of 2,4-D. Increasing the distance between the areas treated [separately] with IA and 2,4-D either decreased the magnitude of inhibition or caused additive effects. Depending upon whether IA functioned as an activator or inhibitor, the responses induced by mixtures of IA and 2,4-D were qualitatively and quantitatively the same as responses induced by a higher or lower dose of 2,4-D. Results obtained with IA and 2,4-D were essentially the same as those induced by mixtures of 2,4-D and either 1-NOA, cinnamic acid, sodium fluoride, or iodoacetic acid. 1-NOA also inhibited the action of 2-NOA, IA, 2,4,5-T, TIB, 1-NA,  $\alpha$ -(2,4-dichlorophenoxy)propionic acid, and maleic hydrazide. Thus the activation or inhibition of the action of 2,4-D or other growth regulators was of a general nature which did not depend upon structural specificity of the activator or inhibitor. Treatment of the soil with mixtures of IA and 2,4-D, or adding one substance to the soil and the other to one leaflet, resulted in additive effects under certain conditions but not inhibitive effects. 1-NOA was an effective pre-emergence herbicide in greenhouse tests when applied at the rate of about 2 lb. per acre as a pre-emergence treatment, giving 90 to 98% control of broad-leaved weeds for at least three weeks. [From authors' summary.]

1468. MORITA, S., AND AOKI, A.  
The effect of 2,4-D on the microbial action in orchard soils.  
*Saikyō Univ. Sci. Repts Agric.*, 1952, 2: 1-4, from abstr. in *Soils and Ferts*, 1952, 15, No. 2039.

2,4-D sometimes suppressed and sometimes promoted ammonification, depending on the type of soil. Maximum value was obtained within 28 days after application. Nitrification was decreased by 2,4-D after 5-7 days, then increased up to 14 days and thereafter decreased.

1469. LINSE, H.  
Empfindlichkeitsunterschiede für Wachstumsstoffe bei Koleoptilen und Primärblättern monocotyler, sowie bei Epi- und Hypocotylen dicotyler Pflanzen. (Differences in susceptibility to growth substances in the coleoptiles and primary leaves of monocotyledons and in the epicotyls and hypocotyls of dicotyledons.)  
*Planta*, 1952, 41: 25-39, bibl. 8.



Coleoptiles of 4 cereals treated with indole-3-acetic acid paste responded with increased growth, while the primary leaves of coleoptile-treated plants were inhibited by concentrations that stimulated coleoptile growth. An application of the paste to the hypocotyl of whole cucumber, rape, sunflower and cress seedlings and to the epicotyl of pea seedlings produced a reaction corresponding to that of the primary leaves of cereals, whereas the response of decapitated seedlings was similar to that of coleoptiles. A hypothesis is advanced to explain the various growth curves obtained.

1470. HARDER, R., AND OPPERMANN, A.

Einfluss von 2,3,5-trijodbenzoesäure auf die Blütenbildung und die vegetative Gestaltung von *Kalanchoë blossfeldiana*. (The influence of 2,3,5-triiodobenzoic acid on flower formation and vegetative development of *Kalanchoë blossfeldiana*)  
*Planta*, 1952, 41: 1-24, bibl. 26, illus.

2,3,5-triiodobenzoic acid at concentrations ranging from 1:5,000 to 1:1,000,000 was injected into leaves of *Kalanchoë blossfeldiana* plants receiving different photoperiodic treatments. With all treatments, short- or long-day, the acid caused an inhibition of flowering which increased with concentration. The vegetative development of the plants was also inhibited and malformations were induced. The theory of flower inhibition is discussed.—Göttingen University.

1471. DAVIS, D.

Inducing disease resistance with plant growth-regulators.

From abstr. in *Phytopathology*, 1952, 42: 465.

Growth regulators were applied to tomatoes in the chemotherapy assay for *Fusarium* wilt. A single application of 2,4-D (5 p.p.m.) to foliage, 10 or 4 days before or 4 days after inoculation with *Fusarium*, resulted in wilt the severity of which was 0, 12 and 78% of that in check plants, respectively. Naphthaleneacetic acid,  $\beta$ -naphthoxyacetic acid, indole-3-acetic acid and 2,3,5-triiodobenzoic acid (an antagonist of indole-3-acetic acid) all reduced disease in the same pattern as that described for 2,4-D. Thus, the effect of treatment always became more pronounced with time. In view of their low fungitoxicity and of the time which must elapse before the maximum effect is attained, these compounds are unlikely to reduce disease by direct action as fungitoxicants or toxin inactivators. It is, therefore, postulated that these compounds produce metabolic changes in the host, rendering it unfavourable for the development of disease.

1472. WAGGONER, P. E., AND DIMOND, A. E.

Crown gall suppression by ionizing radiation.  
*Amer. J. Bot.*, 1952, 39: 679-84, bibl. 14.

Experiments at Connecticut Agricultural Experiment Station indicated that radiation suppresses galls (*Agrobacterium tumefaciens*) in tomato (among other plants) by affecting growth of host tissues in general. It is suggested that short delays in gall formation caused by low doses, and extended or indefinitely long delays caused by high doses of radiation could be due to suppression of auxin production.

1473. STEWARD, F. C., AND CAPLIN, S. M.

Investigations on growth and metabolism of plant cells. III. Evidence for growth inhibitors in certain mature tissues.

*Ann. Bot. Lond.*, 1952, 16: 477-89, bibl. 13.

Using the carrot explant technique, with added coconut-milk factor, evidence has been obtained of inhibitors of growth in potato tubers, onion bulbs, and maple buds. In discussion it is suggested that the regulation of growth in such tissues as mature parenchyma may thus be due to absence of necessary growth-factors or the presence of growth inhibitors. [Authors' abstract.]

1474. STEWARD, F. C., AND CAPLIN, S. M.

Investigations on growth and metabolism of plant cells. IV. Evidence on the role of the coconut-milk factor in development.

*Ann. Bot. Lond.*, 1952, 16: 491-504, bibl. 10.

By the carrot-assay method it has been shown that the watery endosperm of coconut contains the growth-promoting coconut-milk factor at all stages of development. Some activity is shown by the parts of the immature embryo but not by the solid endosperm. Sources of analogous activity are in the endosperm of *Zea mays* in the milk stage, the gelatinous content of immature fruits of *Juglans regia*, and the young gametophyte of *Ginkgo biloba*. The data for other cases examined suggest that the material develops best in nutritive tissues associated with delayed embryo development. [Authors' abstract.]

*Soil problems and irrigation.*

(See also 1548-1555, 2002, 2157, 2158.)

1475. DAVIES, J. N., AND OWEN, O.

Steam sterilization studies.

*A.R. Cheshunt exp. Res. Stat.* 1951, 1952, pp. 67-78, bibl. 5.

The study of ammonification and nitrification in soil after steam sterilization has been continued. Turning over steamed soil in the glasshouse to a depth of 9 in. at weekly intervals hastened the onset of nitrification. This is probably due (1) to aerial contamination, the nitrifying organisms being introduced into the main body of the soil by digging, and (2) to improved aeration. By contrast, the concentration of ammonia in undisturbed steamed soil remained high for long periods.

1476. STOLP, D. W.

De waterhuishouding in de tuinbouw. (The utilization of water resources in horticulture.)

[English summary  $\frac{1}{2}$  p.]

*Meded. Dir. Tuinb.*, 1952, 15: 693-712, bibl. 107.

Methods of controlling water supply by regulating the water table and giving underground, furrow or sprinkler irrigation are reviewed, and the water requirements of plants are discussed.

1477. GILDEN, R. O., AND WOODWARD, G. O.

Low-cost irrigation structures.

*Ext. Bull. Wash. St. Coll.* 469, 1952, pp. 16, illus.

Ten different irrigation structures are fully illustrated by diagrams and photographs. The captions are to the point and the materials needed for each structure are specified.



1478. ANON.

**Mist irrigation.***Comm. Grower*\*, 1952, No. 2973, p. 1154.

For watering glasshouse crops by the system in which the water is "atomized" and sprayed in fog-like formation, it was found that switching on for 10 min. in the morning, afternoon, and, if necessary, evening, is adequate. The equipment, consisting of metal piping rigged overhead on which nozzles are spaced at about 6 ft. intervals, is stated to be also efficient for the application of nutrients, sprays and sterilizing substances. Further, it is recommended for outdoor crops, and in orchards could be used for anti-frost spraying, irrigation and normal spraying. Other possible uses of the system, such as providing an insulating mist layer over a glasshouse against loss of heat in the winter and overheating in the summer, are considered.

1479. JOHNSTON, C. N.

**Irrigation pumps, their selection and use.***Circ. Calif. agric. Ext. Serv.* 415, 1952, pp. 54, illus.

This circular discusses the various types of pumps (centrifugal, turbine, screw-type, combination or mixed-flow pump runner); their operating behaviour; the choice of a suitable type, including notes on the capacity of pump needed, the use of a reservoir with a small water supply, the rates of application of water for various soil types and methods, well characteristics, and the fitting of pumps to wells; costs and methods of installation; and the care and maintenance of plant.

**Nutrition.**

(See also 1503p.)

1480. MCCOLLAM, M. E.

**The leaf analysis approach to crop nutrition.***Bett. Crops*, 1952, 36: 6-14, 43-4, illus.

Tables are provided showing the types of leaf, including those of deciduous-, soft- and citrus fruit and vegetables, suitable for sampling, the time to take them under Californian conditions, and significant N, P and K levels for the same crops. Fertilizer recommendations, surveys of plant nutrient status and identification of abnormal symptoms are among the practical uses of leaf analyses.

1481. BLANCHET, R.

**Le diagnostic foliaire—son application à l'horticulture. (Foliar diagnosis—its application in horticulture.)***Rev. hort. Paris*, 1953, 125: 804-7.

Factors affecting the value of foliar diagnosis of mineral status are discussed, an account is given of the method used and the interpretation of results, and suggestions are made for a possible extension of its use in vegetable, flower and fruit cultivation.

1482. PIRONE, P. P.

**Feeding plants through the leaves.***Gdn J. N.Y. bot. Gdn*, 1952, 2: 45, 60.

Trials have been in progress for 3 years in the New York Botanic Garden with proprietary nutritional leaf sprays, chiefly Rapidgro which is a completely water-soluble fertilizer containing 23% N (mainly from urea), 21% phosphoric acid, 17% K, and about a dozen other elements. A number of applications (for example, 5 at

7-10 day intervals) are made at a concentration of 1 oz. to 2 gal. water. Consistently excellent results have been obtained with avenue trees (Norway maple, London plane, elm, linden) and roses, chrysanthemums, tomatoes, yews, boxwood, azaleas, holly and geraniums.

1483. PFÜTZER, G., PFAFF, C., AND ROTH, H.

**Die Vitaminbildung der höheren Pflanze in Abhängigkeit von ihrer Ernährung. (The effect of nutrition on vitamin formation in higher plants.)***Landw. Forsch.*, 1952, 4: 105-18, bibl. 16.

In this paper read before the 2nd Fertilizer Congress in Rome the authors summarize their results of 10 years' nutritional study. In field trials they found that vitamin content remains at least constant when yields were increased by fertilizer applications at the usual rate. In pot trials increases in vitamin content were observed as a result of higher fertilizer applications. Nitrogen was found to be of importance for the formation of carotene, of N-containing vitamins of the B-group and of phosphatides (lecithine, cholin). Phosphoric acid had a significant effect in increasing vitamin B<sub>1</sub> and phosphate content. Ascorbic acid formation was favourably affected by potassium which counteracted the adverse influence of shade. Vitamin content was also increased by lime (optimum soil reaction), magnesium and trace elements; mineral deficiencies, on the other hand, reduced vitamin content. The data presented in this summary refer almost exclusively to the influence of various nutrients on the vitamin content of spinach.—*Landw. Versuchsstat. Limburgerhof*.

1484. BROWN, J. C., AND HENDRICKS, S. B.

**Enzymatic activities as indications of copper and iron deficiencies in plants.***Plant Physiol.*, 1952, 27: 651-60, bibl. 18, illus.

Relative activities of ascorbic acid oxidase, catalase, and peroxidase were measured at two or three periods of growth in plants, including tobacco, grown on a soil of limited copper supplying capacity, another of limited iron supplying capacity, and two mixtures of these soils. Ascorbic acid oxidase activity was found to be markedly reduced by limited copper supply, Catalase was reduced in relative activity for tobacco and some other plants when the iron supply was limited. The activity of peroxidase was more constant. The hypothesis that if an element is limiting in the nutrition of a plant the deficiency will be evident in the changed activity of an enzyme among those requiring the element for function is in harmony with the results obtained.—*U.S. Dep. Agric., Beltsville, Maryland*.

1485. MULDER, E. G., AND GERRETSEN, F. C.

**Soil manganese in relation to plant growth.***Advances Agron.*, 1952, 4: 222-77, bibl. extensive.

This review article discusses Mn determination, Mn in the soil, and Mn in the plant with reference to content, deficiency, deficiency correction, Mn nutrition and fertilizer interactions, toxicity and function.

1486. GILBERT, F. A.

**Copper in nutrition.***Advances Agron.*, 1952, 4: 147-77, bibl. extensive.

This review article discusses the value of Cu to the

\* Formerly *Fruitgrower*.



plant, the effects of Cu deficiency in plants, Cu in the soil and the geographical regions of Cu deficiency.

1487. WINSOR, G. W., AND LONG, M. I. E.

**The properties of some urea-formaldehyde materials in relation to their possible use as nitrogenous fertilizers.**

*A.R. Cheshunt exp. Res. Stat.* 1951, 1952, pp. 56-67, bibl. 8.

Urea-formaldehyde products can be prepared having rates of mineralization of their nitrogen in soil similar to those of a sample of finely ground hoof and horn under laboratory conditions. Whether or not such samples have any practical application as nitrogenous fertilizers is largely a question of economics, as yet unanswered. None of the samples as yet tested can, however, be said to fulfil all the requirements of an ideal slow-acting synthetic nitrogenous fertilizer.

1488. HUDGINS, H. N., AND OTHERS.

**Bibliography of literature on potash as a plant nutrient.**

*Suppl. Bibliography of Literature on Potash as a plant nutrient*, 1952, pp. 99.

The bibliography, which follows the pattern of earlier publications in this series [*H.A.*, 19: 819], covers the period July to September 1941. An author and subject index is provided.

1489. BARBIER, G., AND CHABANNES, J.

**Accumulation du sodium dans les racines des plantes. (The accumulation of sodium in roots.)**

*Ann. agron. Sér. A*, 1951, 2: 545-6 [received 1953].

Analysis of peas grown in sand and nutrient solution culture has shown that the sodium content of the roots is very much higher than that of the stems, leaves or pods. The data submitted prove that Na accumulation in the roots occurs only after the substance has passed through the rest of the plant. In this case, therefore, selective cation absorption is not a function of the root hairs.—Versailles.

### *Seeds and seed treatment.*

(See also 2068, 2381, 2395.)

1490. BARTON, L. V.

**Relation of different gases to the soaking injury of seeds. II.**

*Contr. Boyce Thompson Inst.*, 1952, 17: 7-34, bibl. 22, illus.

In a previous paper [see *H.A.*, 21: 581] it was shown that soaking injury to seeds is enhanced by passing oxygen through the water in which the seeds are soaked, and reduced by similar treatment with carbon dioxide. It is suggested that soaking injury may be related to the amount of water absorbed. In the present paper, describing experiments in which salt and polyvinylpyrrolidone solutions as well as water were used, these findings were confirmed. Polyvinylpyrrolidone in 5 and 10% solutions retarded the absorption of water by bean seeds and reduced soaking injury in the presence of oxygen but had no effect in the presence of carbon dioxide. Rice seeds, which germinate normally under water, were not injured by the presence of oxygen in the water, but their water absorption and germination were delayed by treatment with carbon dioxide during

soaking. Injury of bean, tomato and cereal seeds by soaking in salt solutions containing major and minor elements was prevented by supplying carbon dioxide during the soaking process. Measurements of the amount of P and K absorbed, germination ability, and growth of plants produced after soaking the seeds in various solutions with different gas supply indicate the possibility of supplying fertilizers and deficient trace elements by pre-planting soaking. Carbon dioxide also prevented injury of wheat seeds by solutions of sodium selenate and of bean seeds by solutions of 2,4-D. It increased the resistance of maize seeds to low temperatures. Increased growth of bean seeds soaked in carbonated water prior to planting was demonstrated. Although the evidence shows that these effects are largely due to control of moisture absorption, further work, especially on the nature and amounts of enzymes involved, is needed.

1491. EVERSON, L. E., AND DUNHAM, R. S.

**The effect of 2,4-dichlorophenoxyacetic acid on certain weed and crop seeds.**

*Tech. Bull. Minn. agric. Exp. Stat.* 197, 1951, pp. 24, bibl. 35, illus. [received 1953].

Aqueous solutions of the triethanolamine salt of 2,4-D at 100 and 1,000 p.p.m. concentration inhibited radicle growth; there were indications of stimulation at 0.1 and 1 p.p.m. concentrations. Dry corn and wild mustard seeds were slightly injured by exposure to volatile 2,4-D; wet seeds were not affected. The 2,4-D or its effects persisted in seeds stored dry at 30° C. for at least 6 months. Dormant, water-permeable seeds showed inhibitory effects of 2,4-D treatments after storage in warm, moist peat soil for 7 weeks, but on, or in, the seed coats of impermeable seeds stored under similar conditions the chemical was inactivated. When the seed coats of treated water-permeable seeds were removed, subsequent seedling growth was markedly reduced; when the seed coats of treated impermeable seeds were removed growth was normal.

1492. RUBAN, E. L., AND DOLGOPOLOV, N. N.

**The effect of ultrasonic oscillations on the early phases of development of plants. [Russian.]**

*Doklady Akad. Nauk S.S.S.R.*, 1952, 84: 623-6.

The germination of seeds of a number of vegetable and field crop plants was stimulated when they were subjected to ultrasonic irradiation. Beans (*Phaseolus* sp.), olive, and cereals are particularly mentioned. Results were enhanced when the treatment was applied to second generation seeds.

1493. TOMBS, D. M.

**The application of electronics to the cleaning of agricultural products.**

*World Crops*, 1952, 4: 422-4, illus.

A description is given of a machine based on a novel combination of electrical principles, including the utilization of the pulse technique, for the automatic extraction of discoloured seeds from samples.

1494. CRISTÓBAL, U. L.

**Nuevo método para el "control" de insectos en los granos y semillas. (A new method of control of insects in seed.)**

*Rev. Fac. Agron. La Plata*, 1951, 28: 129-31.



The La Plata Faculty of Agronomy and the Regional Entomologist have developed the "activated paper" method. Scraps of paper impregnated with a mixture of 2 kg. 97% lindane to 100 l. deodorized gas-oil are mixed dry with the seed at a minimum rate of 300 g. per 100 kg. seed. The activated paper is lethal to grubs up to a range of 10 cm. The paper has an attractive property which causes the insects to emerge from the seed and touch it. The residual effect of the compound lasts up to 3 months. Control of adults developing during that period is thus achieved.

### *Harvesting and marketing.*

1495. VAN DEN MUIJZENBERG, E. W. B.  
Mechanisatie van de oogst. (**Mechanization of harvesting.**) [English summary 10 lines.]  
*Meded. Dir. Tuinb.*, 1952, **15**: 563-76, bibl. 13, illus.

In its widest sense harvesting includes the operations of picking, removal, cleaning, grading, weighing, packing, etc., the operations varying with the crop. The author, dealing only with horticultural crops, shows that the tendencies in mechanization of harvesting are to combine as many operations as possible in one machine, to simplify each operation, and to avoid damage to the crop. He distinguishes 16 methods of harvesting and shows how each is or could be mechanized. Several mechanical harvesters are illustrated.

1496. BOUDEWIJN, C., AND OTHERS.  
Organisatie en inrichting van de veilingen. I. (**Organization and management of the [Dutch] auction marts. I.**) [English summaries.]

*Meded. Dir. Tuinb.*, 1953, **16**: 9-38, bibl. 6.

From a series of lectures given at the new Institute for the Storage and Processing of Horticultural Products (I.B.V.T.), Wageningen, four dealing with the work of the institute and the administration of auction marts are reported here. A short introduction by C. Boude-  
wijn, president of the institute, is followed by a paper by the director, A. K. Zweede, on "The task and aims of the I.B.V.T.". F. P. J. Bakx deals with "The financing of and investments in the horticultural auction mart societies", showing how they could gradually become more self-sufficient financially if dividends were entered to the credit account of the shareholders instead of being paid out. C. L. M. Kerkhoven deals with "Efficient utilization of labour at auction marts", and discusses, with practical examples, the value of accurate labour studies. Finally there is a paper by W. Tukker on "Efficiency in the book-keeping of the auction mart societies".

### *Practical devices.*

(See also 1744-1746, 2058-2061, 2303, 2389.)

1497. ANON.  
Ein neuer schweizerischer Einachstraktor.  
(**A new Swiss two-wheel tractor.**)  
*Schweiz. Gärtnerztg.*, 1952, Vol. **55**, No. 50, pp. 4, illus.

This new, Swiss made, two-wheel Bucher tractor with a 10 h.p. 4-stroke engine appears to have interesting possibilities for horticultural smallholdings, many of its

attachable implements having been designed for use in the orchard and market garden.

1498. MCCOLLY, H. F., AND ROTH, F. W.  
**Mechanical stonepickers.**  
*Quart. Bull. Mich. agric. Exp. Stat.*, 1952, **35**: 75-82, illus.

The paper was condensed from a thesis by the junior author entitled "Mechanical removal of stones from agricultural land".

1499. ANON.  
**Tools for easier pruning.**  
*Amer. Fruit Gr.*, 1952, **72** (12): 8-9, 17, illus.

Illustrations of a range of saws, pole pruners, hand pruners, loppers and power pruners on the American market.

1500. ANON.  
**New glasshouse oil-burner.**  
*Comm. Grower\**, 1952, No. 2974, p. 1199, illus.

Particularly useful for steam sterilizing and for attachment to small boilers.

1501. PATTERSON, C. F.  
**Systems for use in the numbering of seedlings and selections in fruit materials.**  
*Rep. Proc. 8th annu. Mtg west. Canad. Soc. Hort.*, 1952, pp. 48-9.

A method is suggested for providing a uniform system of numbering fruit selections made at Research Stations and Universities.

1502. KARMANOV, V. G.  
**An investigation of temperature changes in the leaves of plants due to the heat of ice formation.** [Russian.]  
*Doklady Akad. Nauk S.S.S.R.*, 1952, **84**: 361-3, bibl. 5.

A new type of apparatus suitable for measuring temperatures in thin objects such as leaves is described. The temperature is measured by a semi-conducting micro resistance thermometer which is sufficiently sensitive to register temperature changes when ice forms. Continuous registering of temperature changes was carried out with a short period mirror galvanometer and photographic recording. Three graphs show the temperature changes in leaves taken from three different lemon plants under air temperatures of  $-8.5 \pm 0.2^\circ \text{C}$ .

### *Noted.*

1503.  
a DRAWERT, H.  
Kritische Untersuchungen zur gravimetrischen Bestimmung der Wasserpermeabilität. Ein Beitrag zum Einfluss der  $c_H$  auf die Wasseraufnahme und - Abgabe. (**A critical study of the gravimetric determination of water permeability. A contribution on the influence of pH on the uptake and loss of water.**)  
*Planta*, 1952, **41**: 65-82, bibl. 33.

\* Formerly *Fruitgrower*.

- b DULLFORCE, W. M.  
The labelling of plants: a preliminary survey of labelling methods. Preliminary report on labelling trials at Sutton Bonington.  
*A.R. hort. Educ. Ass.*, 1951, 1952, pp. 72-81, 82-5, bibl. 5.
- c FJÄDERHANE, A. M.  
Undersökning rörande ekonomiska förhållanden inom trädgårdsodlingen åren 1935-1938. (A study of economic conditions in Swedish horticulture during the years 1935-38.)  
Reprinted from *Årsskr. Lantbr. Trädgårdsinst.*, 1946, pp. 1-18, bibl. 2, as *Medd. Trädgårdsekon. Byrån* 4. [Received November 1952].
- d FJÄDERHANE, A. M.  
Räkenskapsresultat från svenska trädgårdsodlingar bokföringsåren 1939-1944. (An economic account of horticultural holdings in Sweden for the years 1939-44.) [English summary 3 pp.]  
Reprinted from *Årsskr. Lantbr. Trädgårdsinst.*, 1947, pp. 107-87, as *Medd. Trädgårdsekon. Byrån* 5 [received November 1952].
- e FJÄDERHANE, A. M.  
Undersökning rörande inom trädgårdsodlingen anställda arbetare, deras yrkesgruppering, ålder och avlöning. (A study of workers employed in Swedish horticulture, their professional status, age and wage.)  
Reprinted from *Årsskr. Lantbr. Trädgårdsinst.*, 1945, pp. 273-87, as *Medd. Trädgårdsekon. Byrån* 3, 1946 [received November 1952].
- f GORFINKIEL, E., AND POLLARD, A. G.  
A modified procedure for determining boron in plant material and soils using 1:1'-dianthrime.  
*J. Sci. Food Agric.*, 1952, 3: 622-4, bibl. 9.
- g DE HAAN, H.  
Periklinale chimaeren bij knopmutanten. (Periclinal chimeras in bud sports.) [English summary  $\frac{3}{4}$  p.]  
*Euphytica*, 1952, 1: 49-56, bibl. 24, illus.
- h HUMPHRIES, E. C.  
The absorption of ions by excised root systems.  
*J. exp. Bot.*, 1952, 3: 291-309, bibl. 13.  
See also *H.A.*, 21: 1311.
- i JONES, G. B.  
The polarographic determination of copper and zinc in plants and soils.  
*Analyt. chim. Acta*, 1952, 7: 578-84, bibl. 15.
- j KRAMER, P. J., AND WIEBE, H. H.  
Longitudinal gradients of  $P^{32}$  absorption in roots.  
*Plant Physiol.*, 1952, 27: 661-74, bibl. 20.
- k LARSON, P., AND BONDE, E.  
Auxins and auxin precursors in plants.  
*Nature*, 1953, 171: 180-1, bibl. 7.
- l MILES, H. W.  
Horticultural education at Wye College.  
*A.R. hort. Educ. Ass.*, 1951, 1952, pp. 100-4.
- m NASON, A.  
Metabolism of micronutrient elements in higher plants. II. Effect of copper deficiency on the isocitric enzyme in tomato leaves.  
*J. biol. Chem.*, 1952, 198: 643-53, bibl. 15, being *Contr. McCallum-Pratt Inst., Johns Hopkins Univ.* 26.
- n OWEN, O.  
Growth regulation.  
*A.R. Progr. appl. Chem. for* 1951, 1952, 36: 663-8, bibl. 47.  
A review on growth substances and hormone herbicides.
- o SCHUBACH, K.  
Lufttemperatur- und Luftfeuchtigkeitsuntersuchungen im Gewächshaus, ein Beitrag zum Gewächshausklima. (Studies of air temperature and air moisture in the glasshouse, a contribution to the subject of glasshouse climate.)  
*Ber. dtsh. Wetterdienst. U.S. Zone* 42, 1952, pp. 27-30, bibl. 3.
- p SCHUFFELEN, A. C.  
De betekenis van "tracers" bij het bemestingsonderzoek. (The importance of tracers in manurial investigations.) [English summary 6 lines.]  
*Meded. Dir. Tuinb.*, 1952, 15: 610-24, bibl. 19, illus.  
With special reference to radio-autographs and the Geiger-Muller counter.
- q STEARN, W. T.  
Nomenclature at the International Horticultural Congress.  
*Gdnrs' Chron.*, 1953, 133: 16-17, 25-6.
- r STEINBERGS, A.  
A rapid turbidimetric method for the determination of small amounts of sulphur in plant material.  
*Analyst*, 1953, 78: 47-53, bibl. 22.
- s STEPHENS, P. R.  
The [New Zealand] Department of Agriculture [1892-1952].  
*N.Z. J. Agric.*, 1952, 85: 371-6, illus.
- t WANNER, H.  
Phosphataseverteilung und Kohlenhydrattransport in der Pflanze. (The distribution of phosphatase and the translocation of carbohydrates in the plant.)  
*Planta*, 1952, 41: 190-4, bibl. 13, illus.
- u WINTER, E.  
Ascorbinsäure-Synthese in Gewebeschnitten. (Ascorbic acid synthesis in tissue sections.)  
*Planta*, 1952, 41: 52-8, bibl. 12.



## TREE FRUITS, DECIDUOUS.

*General.*

(See also 1428, 1429, 1438, 1578f, 2371, 2374, 2375, 2382, 2398, 2400.)

## 1504. TUKEY, H. B.

**Trends in European fruit growing.**

*Amer. Fruit Gr.*, 1953, 73 (1): 37-9, illus.

Figures are presented showing large increases in fruit production in west European countries since before the war, and the extensive use of fruits for juice purposes is commented on. Notes are given on solving environmental problems, such as the use of anti-hail rockets in northern Italy, the planting of protective hedges in the lower Rhône Valley and the mineral deficiency work carried out at Long Ashton. Breeding of new varieties, particularly in Great Britain, is mentioned.

## 1505. HAMBOULLAS, K.

**Fruit growing.**

*Countryman, Nicosia*, 1953, 7 (1): 10-16, illus.

Including lists of pome and stone fruit varieties recommended for hill areas and the plains in Cyprus.

## 1506. CHEVALIER, A.

Points de vue nouveaux sur l'amélioration de la fruticulture en France aux XVI<sup>e</sup> et XVII<sup>e</sup> siècles et à l'époque actuelle. (New points of view on the improvement of fruit growing in France in the sixteenth and seventeenth centuries and at the present day.)

*Rev. int. Bot. appl.*, 1952, 32: 460-74.

Notes on advances in French pomology since the Renaissance are followed by recommendations for current improvement. The latter include expansion of the top-working of mediocre with improved varieties, a large increase in the production of dessert fruit, and—in the case of colonial as well as metropolitan fruits—a reduction in transport and other costs and an improvement in cultural techniques with a view to expanding exports to other European countries.

## 1507. DE BARROS, H., AND VITAL RODRIGUES, R.

Sur la production et le commerce des fruits au Portugal. (Fruit growing and marketing in Portugal.)

*Fruits d'Outre Mer*, 1952, 7: 542-8.

Fruit growing in Portugal was characterized for a long time by the employment of too many varieties for good commercial development and the absence of large orchards. In 1930, however, the government began to encourage better cultural methods, and market organization. According to a census taken in 1932 the order of importance of the chief fruit crops (based on number of trees in cultivation) was (1) almond and fig, (2) apple, (3) pear, (4) plum and peach, (5) orange and cherry. The three main fruit growing areas are (1) the coastal region of Algarve province in the south—almond, fig, carob; (2) Centre Littoral near Lisbon, and Ribatejo in the Tagus valley—apricots, apples, oranges, pears, peaches, cherries; (3) the Douro valley in the north—early cherries, apples, pears, plums, oranges, almonds. Other minor areas include Cova de Beira in Beira Baixa province, where morello cherries are grown among other crops, and Elvas in Alto Alentejo province,

famous for its dried plums. The chief export crops (on the basis of tonnage in 1951) are carobs, almonds, dried figs, chestnuts (chiefly to Brazil), pineapples (Germany, U.K. and France), melons (chiefly Brazil), and grapes (Brazil and U.K.). Whereas exports of fresh fruit are lower than before the war, those of dried fruit (especially carob) are very much higher.

## 1508. ADAMSON, N. J.

**Horticulture in the Moutere Hills.**

*The Moutere Gravels, Waimea County, Nelson.*

Nelson Catchment Board, Nelson, N.Z., 1952, pp. 56-65, illus.

The article by Adamson is one of a series of 8 original papers on the soils, topography and land utilization of the Moutere Gravels of the Nelson district. In his short history of the development of a tract of marginal land (rainfall 40 in.) in New Zealand since 1911 into a thriving commercial apple and pear growing centre, he includes a description of the steps taken to maintain soil fertility. Fertilizer recommendations are made for major and minor elements. The successful small-scale production of boysenberries, strawberries and grapes demonstrates the further potentialities of this area.

## 1509. NONNECKE, I. L.

**Fruit investigations at Lethbridge.**

*Rep. Proc. 8th annu. Mtg west. Canad. Soc.*

*Hort.*, 1952, pp. 65-7, bibl. 1.

Climatically southern Alberta does not favour tree fruits. Following the abnormally severe winter of 1949-50, of all the plum and apple varieties under test only the sandcherry plum hybrid Dura succeeded in bringing fruit to maturity. Soft fruits, however, are grown with considerable success, and raspberries and strawberries do particularly well under irrigation.

## 1510. REBOUR, H.

**L'arboriculture en Afrique du Nord. (Fruit growing in North Africa.)**

*Pomol. franç.*, 1952, 79: 126-8.

The 4 principal crops are olive, citrus, date palm and fig. Brief notes are given on the climatic zones of French North Africa, water resources, soil, the areas under cultivation, and the annual yields of the chief tree fruit crops.

## 1511. REBOUR, H., AND CHEVALIER, A.

**Les cultures fruitières d'Algérie. État actuel.**

**Perspectives d'avenir. (Algerian fruit growing. Its present position and future prospects.)**

*Rev. int. Bot. appl.*, 1952, 32: 474-9.

Algeria was formerly well ahead of Morocco in fruit production but Morocco, which has much better water resources, has recently made great strides. If North Africa is to compete with California, Brazil and South Africa, it must adopt modern progressive techniques based on scientific research. Statistics (1950) and notes are given on production in Algeria of olives, figs, dates, citrus, table grapes, almonds, plums and apricots. Recommendations for the future include, in addition to the modernization of techniques and rural equipment, the provision of more demonstration and experimental farms, the reduction of production costs, and the introduction or expansion of the growing of apples,



pears, walnuts, chestnuts, pistachio nuts, opuntia, avocado and cherimoya.

1512. CHEVALIER, A.  
La situation des cultures fruitières au Maroc en 1952. (*The fruit growing position in Morocco in 1952.*)  
*C.R. Acad. Sci.*, 1952, 235 (2): 109-11, reprinted in *Rev. int. Bot. appl.*, 1952, 32: 480-2.

During the last 30 years Morocco has made great progress in fruit growing and has shown itself to be one of the most suitable countries in the world for a great variety of species. In 1949 there were 10 million olive trees, mostly African-owned, and the crop could be greatly expanded. The fruits chiefly cultivated by Moroccans are figs, almonds, pomegranates, apricots, black mulberries and carobs; peaches, cherries, walnuts and chestnuts are also grown in the mountains. European colonists chiefly grow citrus (24,000 ha., increasing by 1,500 ha. per annum) and vines (26,000 ha.); the Japanese plum (*Prunus salicina*) is beginning to be grown. Date cultivation is declining owing to disease. Tropical and sub-tropical fruits of lesser importance are also listed.

1513. VALDEYRON, G., AND CROSSA-RAYNAUD, P.  
Les fruits de Tunisie. (*The fruits of Tunisia.*)  
*Ann. Serv. bot. agron. Tunis.*, 1950, 23: 1-124, bibl. 25, illus. [received 1952].

This book, which is addressed to pomologists rather than growers, describes the principal species and varieties of fruits grown in Tunisia as unirrigated crops. In the order of their importance the species are olive (chiefly for oil), almond, apricot, plum, pear, apple and fig, the last 4 being of negligible importance. Part I consists of notes on the distribution, characteristics and culture of the chief native and introduced varieties. A differentiation is made between "traditional" and "modern" methods of cultivation, but the great debt which the latter owe to the former is stressed and it is pointed out that the traditional Sfax methods, for example, are difficult to improve upon. Notes are given on cultivated varieties of the following origins: (1) *olives*: Tunisian, Italian and Spanish (oil), French and Californian "Queens" (table); (2) *almonds*: Tunisian, Italian, French and Spanish; (3) *apricots*: Tunisian, Spanish, American and French; (4) *plum, pear, apple and fig*: Tunisian. Part II consists of an index of the varieties in collections in experimental orchards in various parts of Tunisia.

1514. VYSOCKÝ, K. A.  
Fruit growing in the zone of the main Turkmen canal. [Russian.]  
*Sad i Ogorod*, 1952, No. 11, pp. 6-9.

The soil of the Horezm oasis, situated in the delta of the Amu-Daria, is saline, and the climate is very dry with a yearly precipitation of only 81-86 mm., a relative humidity of 27-45%, and very severe winters. Over half the total fruit grown in the area are apricots, peaches being second in importance and apples third. Pears, plums and cherries are cultivated only rarely and soft fruits not at all, though the author considers the conditions suitable for limited soft fruit growing. Suitable varieties of top fruits are listed, and their cultivation throughout the northern area of the main Turkmen canal is recommended.

1515. FJÄDERHANE, A. M.  
Arbetsstudier i fruktodlingen. (*Time studies in fruit growing.*)  
*Medd. Alnarsinst. Trädgårdsavd. drifts-ekon. Byrån* 8, [1952?], pp. 22.

In this communication on fruit growing the following operations are analysed under a variety of conditions: spraying; picking of apples (Cox's Orange and Gravenstein), plums, strawberries and raspberries; grading and packing of apples of several varieties; ploughing of orchards; thinning of apple fruits; and planting of rootstocks. [For a general discussion of the time-study scheme initiated by the Bureau of Horticultural Economics, Alnarp, and for further data on spraying, pruning, the gathering of pruning wood, hoeing and re-grafting, see *Medd.* 6 and 10, and abstract 1434.]

*Breeding and varieties.*  
(See also 1578c, d, g, 2404.)

1516. CHANASYK, V.  
Fruit trials at Beaverlodge.  
*Rep. Proc. 8th annu. Mtg west. Canad. Soc. Hort.*, 1952, pp. 68-70.

Recommendations, based on observations during and following the very severe winter of 1949-50, are made for apple, crab apple, *Prunus* and soft fruit varieties for Alberta.

1517. ZWINTZSCHER, M.  
Selectie van schurftresistente fruitrassen. (*The selection of scab-resistant fruit varieties.*)  
*Fruittelt*, 1952, 42: 973-4.

A brief account is given of the work done at the Max Planck Institut für Züchtungsforschung, Voldagsen, Germany, on the breeding of scab-resistant apple and pear varieties.

1518. TERMOHLEN, G. P.  
Schurftresistente van appel. (*Scab resistance in apples.*)  
*Fruittelt*, 1952, 42: 965-7, illus.

The methods that are being used, mainly in Germany and America, to produce a scab resistant apple variety are outlined, and some of the problems involved are discussed.

1519. DE SONNAVILLE, P.  
Chimaerenvorming bij het grote fruit. (*The development of chimeras in top fruit.*)  
*Not. Studiekring voor PlVered., Wageningen*, 1951, pp. 436-42, from English abstr. in *Euphytica*, 1952, 1: 153-4.

Some instances of chimeras in pears, cherries and apples are mentioned. The author has obtained mixoploid seedlings of Cox and Jonathan apples by colchicine treatment. An attempt will be made to select periclinal chimeras and homogeneous tetraploids from this material.

1520. CRANE, M. B., AND MARKS, E.  
Pear-apple hybrids.  
*Nature*, 1952, 170: 1017, bibl. 3, illus.

The authors produced the first sexual hybrids between pears and apples by pollinating flowers of the pear variety Fertility with an unnamed tetraploid apple and with the diploid apple variety Crawley Beauty. After



emasculatation and again after pollination the ovaries were treated with a 40 p.p.m. solution of  $\beta$ -naphthoxy-acetic acid. From a total of 15 fruits obtained 92 seeds were sown, out of which 68 germinated. All the seedlings had a defective root system, but 11 of them survived showing intermediate characters. From preliminary experiments on the grafting of some of the hybrids it appears that difficulty in growth may be overcome. It is believed that the successful cross is due to the application of  $\beta$ -naphthoxy-acetic acid, since earlier attempts had failed persistently in the absence of such treatment.—John Innes hort. Instn.

1521. WILNER, J.

**The importance of maturity in cold resistance of certain woody plants grown under various climatic conditions on the prairies.**

*Rep. Proc. 8th annu. Mtg west. Canad. Soc. Hort.*, 1952, pp. 40-7.

Data of an exploratory study, conducted at 8 widely separated Western Canadian Horticultural Stations, suggest that, in view of its more vigorous growth and possibly greater maturity, Heyer No. 12 apple may physiologically be considered a more suitable variety for western Canada than Columbia crab. An outline is given of further investigations on hardiness.

1522. KOVALEV, N. V., AND TUPICYN, D. I.

**Apples as a commercial crop in the region of the main Turkmen canal. [Russian.]**

*Sad i Ogorod*, 1952, No. 10, pp. 14-16.

It is proposed that apples shall comprise 33% of all fruit grown in the areas adjoining the main Turkmen canal, instead of the present 6%. Among the varieties recommended for different localities are Winter Gold Pearmain, Orleans Reinette, Gravenstein, Winter Banana and Jonathan. For rootstocks local varieties unsuitable for commercial cultivation but resistant to the high salt content of the soil, and seedlings of cultivated varieties, especially Rosmarin and Kandilj sinap, were found very satisfactory.

1523. SIMONNEAU, P.

**Le pommier espagnol ou pommier "Llorca". (The Spanish apple variety Llorca.)**

*Fruits et Prim.*, 1952, 22: 368-75, illus.

The apple variety Llorca, introduced from Spain, is now being propagated in Moroccan nurseries and becoming popular in French North Africa. Experiments carried out in the orchards of Perrégaux in 1947 and 1948 have shown that radical fruit thinning after the sirocco greatly improves fruit size and quality without loss of crop. The cultural requirements of the variety are discussed in detail.

1524. MOTOVILOV, B. A.

**New apricot varieties for the steppe part of the Kuban. [Russian.]**

*Sad i Ogorod*, 1952, No. 11, pp. 26-7, illus.

In the Kuban apricot seedlings are grown widely, in some areas in shelter belts, but their yields and quality are mostly inferior. Crosses made in Krasnodar since 1939 between 21 of the best quality, frost resistant and productive seedlings produced 3 new promising varieties, the characteristics of which are briefly described.

1525. MAURER, K. J.

**Die Maraschka-Kirsche (*Prunus acidula* f. *marasca* Rchb., *Cerasus marasca* Host.).**

**(The acid cherry *Prunus acidula* f. *marasca*.)**

*Dtsch. Garten*, 1952, No. 19/20, p. 1.

On account of its strong, characteristic flavour and the deep, dark-red colour of its juice the self-fertile acid cherry *Prunus acidula* f. *marasca* is suitable for blending with processed products of other cherry varieties. The growth habit of the bushy tree, which is indigenous in Dalmatia, and the characteristics of the fruit are described and data on fruit composition are given. O.J.

1526. ALDERMAN, W. H., AND WEIR, T. S.

**Meteor cherry.**

*Minn. Hort.*, 1953, 81: 3, illus.

This new, hardy sour cherry, introduced by the University of Minnesota Fruit Breeding Farm, is similar in fruit type to Montmorency, its female parent. Its hardiness is derived from the male parent which was the product of repeated selections from the Russian varieties Vladimir and Shubianca.

*Propagation and rootstocks.*

(See also 1460, 1578j.)

1527. URE, C. R.

**Fruit propagation studies at Morden.**

*Rep. Proc. 8th annu. Mtg west. Canad. Soc.*

*Hort.*, 1952, pp. 52-61.

The various propagation studies conducted since 1920 are reviewed under (1) handling of fruit seed, (2) rootstock investigations, and (3) methods contributing to successful propagation.

1528. DE HAAS, P. G., AND SCHANDER, H.

**Keimungsphysiologische Studien an Kernobst. I. Samen und Keimung. (Studies on the germination physiology of pome fruit. I. Seed and germination.)**

Reprinted from *Z. Pflanzenz.*, 1952, 31: 457-512, bibl. 281, illus.

This review of the literature, supplemented by some original contributions from the authors, is a more comprehensive study of the germination physiology of pome fruit than was Schander's earlier paper on the subject [*H.A.*, 23: 167]. Temperature is considered the most important external factor influencing germination processes in pome fruits, 2-5° C. being the optimum depending on variety, locality and pre-treatment. During the first stages of germination the seed is very susceptible to higher temperatures, but greater tolerance is acquired with longer exposure to low temperatures. Some germination processes are initiated below 0° C. The relationship between seed germination and the raising of seedling rootstocks is discussed.

1529. SCHANDER, H.

**Die Sichtung von Kernobstsamen mit Hilfe von horizontalem Wind. (The grading of pome fruit seed by horizontal winnowing.)** *Grundl. Landtech.*, [1952?], No. 2, p. 26.

It is shown that pome fruit seed may be graded by horizontal fanning, the most valuable seed (high specific gravity) being carried the shortest distance.

O.J.

1530. REMY, P.

Le rôle du tégument des graines d'arbres fruitiers dans leur germination (genre *Prunus*). (The role of the seed coat in the germination of fruit tree seeds (genus *Prunus*).)

*Ann. Amél. Plantes*, 1952, 2: 347-9, bibl. 4.

A study of the germination of *Prunus armeniaca*, *P. domestica* and *P. persica* stones on agar showed that the seed coat is a mechanical obstacle to the progress of germination, preventing the opening of the cotyledons. No chemical inhibitor was found to diffuse from the testa into the agar.—Station de Recherches viticoles et d'Arboriculture fruitière du Sud-Ouest.

1531. HARGRAVE, P. D.

Stratification practices with seeds for root stocks.

*Rep. Proc. 8th annu. Mtg west. Canad. Soc. Hort.*, 1952, pp. 62-3.

The time required for the satisfactory stratification of seed of 13 *Prunus*, 1 *Pyrus* and some *Malus* varieties at 38-41° F. is recorded. *Pyrus ussuriensis* required 55-60 days, the *Malus* varieties 75 days, and most of the *Prunus* either 100-116 or 150 days.

1532. HILTON, R. J.

Climatic influence on fruit propagation.

*Rep. Proc. 8th annu. Mtg west. Canad. Soc. Hort.*, 1952, pp. 63-5.

The possible causes of failure in the vegetative propagation of fruit trees are reviewed under low temperature injury and spring weather effects.

1533. KEMMER, E., AND KIRCHHOFF, R.-H.

Über die autovegetative Vermehrung von Apfelsorten. (The auto-vegetative propagation of apple varieties.)

*Züchter*, 1952, 22: 289-98, bibl. 45, illus.

A comparison was made between the performances of own-rooted and worked apple varieties. The results of 4 years' small-scale trials are thought to give some useful pointers. The experiments were of two sorts, viz. those in which use was made of cuttings and layers, etc., and experiments in which root grafting was used. *Type I. (a)* Cuttings. Seedling and clonal rootstocks were inarched with 30 cm. long cuttings of the variety Croncels, the basal end of the cutting being placed in a pot filled with humus which was then buried in the soil. Cuttings of 2-year-old wood showed 71% rooting after 1 year and 100% after 2 years, those of 1-year-old wood 43 and 100% respectively and those of the current season's growth 0 and 100% respectively. *(b)* One-year-old shoots were ringed and 12 cm.-long tin cylinders, filled with a humus medium, were placed around them. The medium was kept moist with a cotton wick. Results were relatively unsatisfactory, owing to the smallness of the cylinder, but among the varieties that did respond was Beurré Hardy, which is interesting in view of the difficulty of inducing roots in pears. *(c)* Layering. Shoots of low-branching trees of several apple varieties were layered after ringing or twisting and covered with a mixture of compost soil and peat, which in turn was covered with a layer of stable manure to prevent drying out. This method yielded very good results in the third year, twisting being almost as effective as ringing. In another trial cutting off 7-year-old trees at

ground level and layering the new shoots gave fairly satisfactory results with all varieties, the shoots of Cox's Orange being so well rooted in the second year that they were ready for planting out. The best results were obtained with the layering of shoots from young, ringed seedlings worked on rootstocks. *Type II.* In the second sort of experiment, using the so-called "delayed nurse root" technique, scion rooting was induced in a maiden tree by planting deeply or earthing up. Quicker results were obtained by the "immediate nurse root" method. At the beginning of April bench-grafted plants were planted out in frames into a soil-compost mixture. As the scions began to grow they were earthed up to a height of 8 cm. In November all the scions that had developed a sufficient root system were separated from their stocks and planted in beds. Preliminary tests with EM clones and with seedling rootstocks showed that EM.IX was the best "nurse", the percentage of rooted scions in the year of grafting and in the following year being 17 and 54 respectively. Two years' trials comparing the results of nurse root grafting and layering have so far not shown any significant difference in the rate and percentage of rooting, but differences between the response of varieties were marked. The overall figures for the rooting of scions were about 20% in the first year, about 60% in the second and about 85% in the third.—Inst. für Obstbau, Berlin-Dahlem.

1534. MOLOTOVSKIĬ, G. H., AND PORUCKIĬ, G. V.

The effect of tissue extracts on the union of graft components and rooting of cuttings. [Russian.]

*Doklady Akad. Nauk S.S.S.R.*, 1951, 80: 961-4, bibl. 14, illus. [received Dec. 1952].

Leaf extracts from scion leaves applied to the rootstocks of fruit trees (apple, pear, plum), Solanaceae (tobacco, potato) and woody species (magnolia, *Cinnamomum zeylanicum*) resulted in a quicker and slightly better graft union than a similar treatment with growth substances. The growth substances (indole-3-acetic acid and nicotinic acid) in turn gave considerably better results than a water treatment of the control plants. Respiration and polyphenol oxidase and peroxidase activities in the leaves of the treated plants were practically doubled, accounting for the better union. Tissue extracts from plum leaves and flowers and a saturated carmine extract applied to various cuttings enhanced rooting.

1535. FOREST, B.

La greffe sur charpente. (Framework grafting.)

*Agriculture, Quebec*, 1952, 9: 279-85, bibl. 6, illus.

A description is given of an experiment conducted at the Sainte-Anne-de-la-Pocatière Federal Experimental Station in 1948 and 1949 to compare frameworking and topgrafting as methods of substituting one apple variety for another. Twelve Charlamoff trees of 23-24 years old were grafted with McIntosh, Niobe and Sandow. In frameworking stub- and side-grafting were employed and the 6-8-budded scions were inserted in May every 12-15 inches along the framework branches, which had been topped back for a short distance. Though more expensive, frameworking proved the better method, the trees yielding sooner and more



abundantly than those topgrafted and the vegetative equilibrium being little upset.

1536. MÖSSE, B.

**The origin and structure of bridge tissues in ring-grafted apple stems.**

*J. hort. Sci.*, 1953, 28: 41-8, bibl. 7, illus.

In June 1945, a ring of bark, 1 in. wide, was removed from the stems of M.XVI rootstocks 3 in. above ground level and replaced by a bark ring of either M.XVI, M.IX or 3426 (dwarfing rootstock). A month later they were budded with Cox scions 7 in. above ground level. In spring 1948 it was noted that the M.XVI ring grafts had caused a slight check to growth, and that slightly more growth had been made by trees ring grafted with bark of 3426 (the most dwarfing stock) than by trees ring grafted with bark of the other two stocks. The fact that bark rings of dwarfing rootstocks did not significantly reduce growth or increase precocity of the scions may be due to the establishment of bridges across the ring grafts, for by 1948 all the bark rings derived from M.IX and 3426 had been split by bridges of the M.XVI rootstock, sometimes in several places. A study of the origin and anatomical structure of the bridging tissue is reported. Where the ends of the bark rings did not join, bridges arose at this point by proliferation from existing cells of the underlying rootstock. Where the bridges split the overlying bark rings, however, they arose from concentric bundles formed on the rootstock stem after ring grafting. It is thought probable that the operation of ring grafting may encourage the formation of concentric bundles. Since it seems impossible to ensure that a ring graft shall remain unbroken, it is doubtful whether ring grafting with a 1 in. ring is a suitable method of testing new rootstocks or intermediates. The tissues derived from M.XVI bark rings and the tissues of M.XVI bridges and M.XVI rootstock under Cox scion differed markedly from the tissues of the same rootstock unworked. This is interpreted as a scion effect. Tissues derived from bark rings of the two dwarfing rootstocks were similar in anatomical structure to stems of the same rootstocks unworked.—East Malling Res Stat.

1537. HILKENBÄUMER, F.

**Das Verhalten von Apfelmastbildnern im Jugendstadium unter verschiedenen mittel-deutschen Standortverhältnissen. (The behaviour of apple stem-builders in their juvenile stage in several localities in central Germany.)**

*Züchter*, 1952, 22: 193-206, bibl. 13, illus.

In Germany hardy apple stem-builders did not come into their own until after the severe winters of 1939-41, when the author initiated large-scale trials for their study under different conditions. For an account of the characteristics of stem-builders in the nursery, see *H.A.*, 20: 2338; the present paper deals with their behaviour in the orchard in 6 different localities 4 and 10 years after planting. In these trials 2,322 half- and three-quarter-standard trees were used to observe the influence of 43 stem-builders on 8 varieties with the following, as yet preliminary, results: (1) The vigour of stem-builders, which showed great variation in the first two years, did not necessarily give an indication of the influence exerted on the variety. Slow growing stem-

builders may induce vigorous growth of the top and vigorous stem builders may produce relatively small crowns. In a third group, the vigour of the stem-builder in its juvenile stage and the degree of vigour induced in the scion variety coincide. Disregarding highly incompatible stem-builder varieties, the variation in the vigour of scion varieties—though considerable—was less than that induced by a range of different rootstocks. (2) Besides stem-builders of extreme physiological and mechanical incompatibility, such as *Malus prunifolia* 26, Virginia Crab and Transcendent Crab, there are others which are satisfactory with most scion varieties. (3) In some cases the rate of growth of stem-builders was clearly influenced by locality. (4) Lack of vigour in stem-builder and scion variety was not necessarily related to precocity. The stem-builders Anoka, Hiberna, Jakob Fischer and Maunzenapfel, for instance, all of which induce vigorous growth in the scion variety, also induced early bearing and comparatively heavy initial crops. (5) No relationship was found to exist between frost resistance and vigorous and straight growth in stem-builders.

1538. NILSSON, F.

**Plantskoleskötselns målsättning med hänsyn till fruktodlingen. (The fruit tree nursery [in Sweden].)** [English summary  $\frac{1}{2}$  p.]

*J. roy. Swedish Acad. Agric.*, 1952, 91: 260-7.

In a paper read before the Swedish Academy the author discusses fruit tree production by nurseries in Sweden. Of apple rootstocks the Alnarp stock A2 has acquired the greatest popularity. About one-half of the trees raised are now submitted to the certification scheme which was introduced in 1945.

1539. DEVJATOV, A. S.

**Finding better rootstocks through biological investigations of mature orchards. [Russian.]**  
*Sad i Ogorod*, 1952, No. 12, pp. 12-16, illus.

A close study of mature orchards provides a reliable guide to the suitability of rootstocks for specific varieties within a region. The method clearly shows the various factors affecting the growth and development of the trees, including environment, hybrid nature of the rootstocks, and characteristics of the scion and its influence as a mentor on the rootstock.

1540. CAWTHRON INSTITUTE.

**Apple stock experiments at Annesbrook orchard.**

*A.R. Cawthron Inst.*, N.Z., 1951/52, p. 18.

Double Vigour (French Crab vegetatively propagated) continued to be superior to Northern Spy as a rootstock for the apple variety Statesman in New Zealand. Yield and growth rate of Cox's Orange and Jonathan on Epp's Seedling exceeded those on Northern Spy.

1541. BERNHARD, R.

**Les porte-greffes des arbres fruitiers à noyau. (Stone fruit rootstocks.)**  
*Jardins Fr.*, 1952, 9: 239-53, illus.

An illustrated account is given of the work on rootstock improvement carried out at the Station de Recherches viticoles et d'Arboriculture fruitière du Sud-Ouest.

*Pollination.*

(See also 1446, 1447, 1578i.)

1542. ALDERMAN, W. H., AND WEIR, T. S.

**Pollination studies with stone fruits.***Tech. Bull. Minn. agric. Exp. Stat.* **198**, 1951, pp. 16 [received 1953].

A study of cross fertility in stone fruit species, chiefly plums, was conducted at the Fruit Breeding Farm, Excelsior, between 1930 and 1951. Its objects were to find suitable pollinator varieties and to determine what combinations of varieties would be sufficiently compatible to produce satisfactory crops. The results are given of tests which covered more than a thousand combinations of varieties of native and hybrid plum (*Prunus americana*, *P. nigra*, and *P. hortulana*), European plum (*P. domestica* and *P. insititia*), cherry plum (*P. besseyi*), Nanking cherry (*P. tomentosa*) and Korean cherry (*P. japonica*). Among the data presented are short lists of hybrid or native plum and cherry plum varieties suggested for home and commercial planting, showing their interaction as pollinators, and variety compatibility tables for these two types. It is recommended that pollinators should comprise from one-third to one-quarter of the orchard and be planted in every third row beginning with the second.

*Growth phenomena.*

1543. ALEKSANDROV, V. G.

**An example of convergence in the morphology of fruit of representatives of the sub-families Pomoideae and Prunoideae of the family Rosaceae. [Russian.]***Doklady Akad. Nauk S.S.S.R.*, 1952, **84**: 157-60, bibl. 2, illus.

An account is given of fruits of birch-leaved pear (*Pyrus betulaefolia*) grown in the botanic garden of Sukhum, Georgia, S.S.R. The fruits are very small and often have a reduced number of loculi, three or even only one, in the core. Many with three loculi had otherwise a more or less normal structure but fruits with one loculus had a softer, more mellow pulp. The single chamber was larger than normal and had a larger seed with an unusually thick seed coat possessing a layer of scleroid cells. The author discusses these characters, pointing out their resemblance (convergence) to the morphology of stone fruits in the sub-family Prunoideae.

1544. KOLOMIEC, I. A.

**On phasic readiness for fruit bearing and the pre-fruit bearing period in fruit tree seedlings. [Russian.]***Izv. Akad. Nauk S.S.S.R. Ser. biol.*, 1952, No. 3, pp. 89-104, bibl. 6, illus.

Experiments are described which were designed to throw light on the factors affecting the length of periods before fruiting is initiated. These factors were studied in experiments involving manuring, ringing and grafting. The conclusions drawn were: (1) Young trees of apple and other cultivated fruits raised from buds or cuttings are already at a stage of development allowing of early fruiting. Grafting on a young rootstock does not set back the stage of development of the grafts. (2) Seedlings, before they enter the fruiting stage, must

pass through certain necessary stages of development.

(3) In seedlings of apple, apricot and apparently other cultivated fruit trees, the stages of development which lead to the formation of fruiting organs are relatively short, but the ordinary pre-fruiting period is usually prolonged by lack of nutrients. (4) The stages preparatory to fruiting take different times for the different species examined. Least time is taken in peach, more in apricot and still more in apple. (5) The nutritional conditions necessary for the development of flower buds can be determined in seedlings grown under artificial conditions in pots, by applying various amounts of fertilizers during the period of active growth of the shoots. (6) In general, fruiting of seedlings may be hastened, after the phasic readiness for fruit bearing is achieved, by applying measures which will ensure an increase in the concentration of nutrient materials in the growing point.

1545. WILNER, J.

**The effects of seasonal and cultural variations on maturity of woody plants commonly grown on the Canadian prairies.***Sci. Agric.*, 1952, **32**: 568-73, bibl. 8, being *Contr. Div. Hort. exp. Fms Serv., Ottawa* **780**.

Exploration studies were conducted during the winters of 1950, 1951 and 1952 to investigate the relative effects of seasonal variations and several cultural treatments on the water content of mature twigs of 19 plants commonly grown on the Canadian prairies for wind-break purposes and fruit production. The data revealed that: 1. The water content of mature twigs of woody plants is an inherent trait that cannot be easily modified by the cultural treatments or seasonal variations. 2. In view of the concept favoured by modern workers that greater wood maturity (i.e. relatively lower water content) is a factor in winter survival, selecting plants which possess the desired trait is suggested as a more practical means of increasing the number of hardy plants on the prairies than resorting to cultural treatments. 3. The study revealed the existence of several such plants, and further intensive work to determine the importance of water content at autumn maturity as a major criterion of hardiness of woody plants is being contemplated. [From author's summary.]—Forest Nursery Stat., Indian Head, Sask.

1546. PACHLEWSKI, R.

**Obserwacje nad rozwojem mykorhizy u degenerujacych drzew owocowych w Szkółkach Kornickich. (Observations on the development of mycorrhiza on some degenerated fruit trees in the nurseries of Kórnick Gardens.)***Acta Soc. Bot. Polon.*, 1952, **21**: 577-90, from abstr. in *Soils and Ferts.*, 1953, **16**, No. 315.

In areas showing soil fatigue, the majority of the trees were badly developed and had pseudo-mycorrhiza on their roots. The few scattered trees showing a good development, and all the well developed trees in fertile soil, had endotrophic mycorrhiza of the tolypophagous type. In one-year-old individuals of the apple (Antonovka) there was no such mycorrhiza development in hotbeds as there was in the field.



1547. MARCELLIN, P., AND RANTZ, J.

Calcul de la surface des pommes et des poires en vue d'études comparatives sur les échanges gazeux. (Calculating the surface area of apples and pears with a view to comparative studies of gaseous exchanges.)  
*Fruits d'Outre Mer*, 1953, 8: 11-16.

A description is given of 3 different mathematical methods of calculating the surface area of fairly symmetrical apples and pears.

*Soil management and irrigation.*

(See also 1475-1479.)

1548. ZELENSKAJA, E. D.

Seasonal activity of ash constituents and nitrogen in the various organs of young apple trees. [Russian.]

*Doklady vsesojuz. Akad. sel'sk. Nauk*, 1952, 17 (11): 24-9.

Observations made at the Ukrainian Fruit Research Institute from 1948 to 1950 have shown that the nutrient content of the various organs of an apple tree depends to a considerable extent on their age. The largest amounts of N, P and K were found in young growth containing relatively high quantities of protoplasm. In early spring, the N, P and K content, in contrast to starch, did not decrease in the roots. As the roots started to grow, they began to absorb the nutrients. Part of the mineral nutrients and of the N was transported to the aerial growing points, while the rest was synthesized by the roots themselves. For the fertilization of young apple trees, autumn or early spring applications at a depth of 40-50 cm. are recommended.

1549. KORSACK, A.

Zmiany wilgotności gleby pod różnymi uprawami w sadzie. (Changes in soil moisture in orchards under various cover crops.) [English and Russian summaries 1 p. each.]

*Ann. Univ. Mariae Curie-Skłodowska, Sect. E*, 1951, 6: 253-82, bibl. 28, illus. [received Dec. 1952].

The effects of cover crops on 3-4-year-old apple trees grown on clonal rootstocks were studied in a 2-year trial in Poland. It was shown that the greatest influence upon the growth of trees was exercised by the various moisture conditions of the soil, due to the different cover crops used. Best growth, highest yield and resistance to winter injury was obtained on trees intercropped with poppies and tomatoes. Intercropping with barley reduced growth during the year of intercropping and yield the following season, and was followed by bad winter injury. In sod the trees developed and fruited poorly, indicating that young orchards, in areas where the yearly precipitation is under 600 mm., should not be grassed.

1550. FLEMING, H. K., AND ALDERFER, R. B.

Soil management in a young Montmorency sour cherry orchard.

*Bull. Pa agric. Exp. Stat.* 557, 1952, pp. 17, bibl. 10, illus.

Replicated randomized soil management experiments were conducted in a Montmorency sour cherry orchard on well-drained sandy loam in Erie County from its

sixth to tenth year. Six fertilizer treatments were applied with cultivation and a winter cover crop: (1) 500 lb. per acre 10-10-10; (2) 500 lb. 5-10-10; (3) 500 lb. 10-0-0 (being 313 lb. Na nitrate); (4) 500 lb. 10-6-4; (5) 1,000 lb. 10-10-10; and (6) 1,000 lb. 10-6-4; and 2 treatments, the same as (1) and (2), with ladino clover sod. The results were: fertilizer had no significant effect on tree circumference; the rate of circumference increase was lower in sod for the first 2 years only; in the cultivated section the yields in lb. per tree for the 5-year-period were—treatment (6) 166.5, (3) 143, (5) 142.5, (4) 135, (2) 116.3 and (1) 107.9; with the same fertilizer application, yields were as high in the clover as in the cultivated section; there was a highly significant correlation between tree growth and percent organic matter and the available water-holding capacity of the surface soil (0-6 in.). Conclusions were: spring applications of N alone in the cultivated section and of 5-10-10 in the sod section were the most economical treatments; under cultivation—winter cover crop treatment an N only fertilization programme should be supplemented with P, K, Ca and other elements where cover crop growth is unsatisfactory to ensure erosion control; fertilizers can best be applied when the cover crop is seeded; maintenance of soil fertility and erosion control can best be achieved by clover sod.

1551. FRITZSCHE, R., AND WERENFELS, L.

Einfluss der Düngung auf die Fruchtgrösse bei Kirschen. (The effect of manuring on fruit size in cherries.)

*Schweiz. Z. Obst- u. Weinb.*, 1953, 62: 9-11.

Specified applications of fertilizers to large cherry trees of two varieties increased the mean diameter of fruits by 1.8 mm. above that of unmanured controls. The difference was statistically significant.

1552. SUSA, T., AND OTHERS.

Studies on root development of fruit trees influenced by ground water conditions. [Japanese, with English summary ¼ p.]

*J. hort. Ass. Japan*, 1952, 21: 113-16, bibl. 13.

A high water table had little adverse effect on grape vines, a moderate effect on 2 apple stocks and on red clover and hairy-vetch green manure crops, and a bad effect on persimmons. Both root length and top growth was less in plants grown with a high water table than in plants grown with a lower water table.

1553. ANON.

Een 5-jarige beregeningsproef. (A 5-year irrigation trial.)

*Fruiteelt*, 1952, 42: 919, taken from article in *Obstbau, Stuttgart*, 1 Sept. and 1 Nov., 1952.

A 5-year irrigation trial was carried out on 12 varieties of apple in a standard orchard 40-50 years old. Total yields over the whole period showed a more than 3-fold increase as a result of irrigation. The total yields of the irrigated and non-irrigated trees of each variety are compared graphically. Yields of all varieties were increased by irrigation, but the varieties differed considerably in their response. Goudreinette and Gravenstein showed the greatest increase in yield, while Goudpermain and Comtesse de Paris showed the least.

1554. BROWN, D. S.

Relation of irrigation practice to the differentiation and development of apricot flower buds.

*Bot. Gaz.*, 1952, 114: 95-102, bibl. 4, illus.

Prolonged periods of dry-soil conditions during July, August and September due to no or infrequent irrigations affected Royal apricot trees by (a) limiting the number of flower buds differentiated; (b) delaying the time of differentiation of many of the flower buds; and (c) slowing the rate of development of buds which were differentiated at about the normal time. [Author's summary.]—Univ. Calif., Davis.

1555. LAURENT, J.

Étude comparative de deux méthodes d'irrigation dans les vergers de Colombie britannique (Canada). (A comparative study of two methods of irrigation in British Columbia orchards.)

*Rev. hort. Paris*, 1953, 125: 814-17, bibl. 11, illus.

In a comparison of the technical and economic merits of sprinkler and furrow irrigation in the Okanagan Valley, the balance is in the favour of the sprinkler method.

### *Planting, pruning and hand thinning.*

(See also 1499, 1578e.)

1556. REBOUR, H.

Densité des plantations dans les cultures fruitières. (Planting density of fruit crops.) *Rev. hort. Algér.*, 1952, 56: 316-23.

The factors governing planting density in Algeria are discussed, and a table of suggested densities per ha. is given for a number of crops, either irrigated or under rainfall regimes of 500 and 300 mm. p.a. The crops include apricot, almond, carob, cherry, citrus, date, fig, pomegranate, medlar, olive, peach, pistachio, apple, pear and vine.

1557. V. D. SLIKKE, L. B. H.

De Stringfellowmethode van wortelsnoei. (The Stringfellow method of root pruning.) *Fruitteelt*, 1952, 42: 896.

The Stringfellow method consists of cutting all roots either right back or to a stump of 1 cm. before planting. This eliminates the need for planting holes, planting can be done 3 times as quickly as by the ordinary method, the condition of the soil at the time of planting is of less importance, and the stakes can be set before the trees are planted. In trials with apples on seedling, Doucin and M.IX stocks, excellent growth has been obtained. Trials are planned with pears on quince.

1558. RENAUD, M.

Recherche d'une nouvelle méthode de taille rationnelle des arbres fruitiers à feuilles caduques en Afrique du Nord. (Studies of a new method of pruning deciduous fruit trees in North Africa.)

*Fruits et Prim.*, 1952, 22: 382-403, illus.

Abundantly illustrated instructions are given on the training and pruning of pome and stone fruit trees under North African conditions, based on the natural growth habit of the tree.

1559. FRENCH, B. O.

Thinning canning fruits—results in £ s. d. *Agric. Gaz. N.S.W.*, 1952, 63: 575-6, 614-15, bibl. 1.

It takes about 1 man-hour to thin a mature peach tree by hand. This is equivalent to about 6s. per tree or £27 per acre. As proper thinning results in the saving of at least 2 tons of canning peaches per acre, worth about twice this sum, as well as in reduced picking costs, the operation is clearly profitable under present conditions. The organization of thinning to minimize costs is discussed, and other methods of thinning are mentioned briefly.

1560. (MINISTER OF AGRICULTURE, CANADA.)

Club thinning of peaches.

*A.R. Canada Minist. Agric.* 1951/52, 1952, p. 76.

Tests showed that the average time required for club-thinning was less than one-fifth of that for hand-thinning. The number of fruits remaining on club-thinned trees was greater in every case and the trees produced a slightly higher yield of somewhat smaller fruits, 97% of which were of marketable size. A suitable club consists of a 5-foot hoe handle inserted 6 in. into an 18-in. length of 1½-in. steam hose.

### *Effect of hormones, etc., on fruit development.*

1561. LUCKWILL, L. C.

Studies of fruit development in relation to plant hormones. I. Hormone production by the developing apple seed in relation to fruit drop.

*J. hort. Sci.*, 1953, 28: 14-24, bibl. 8, illus.

Measurements of the rate of fruit drop and the hormone content of the seeds, made at weekly intervals on three varieties of apple, have shown that periods of very active hormone production are invariably associated with periods of low fruit drop. On the basis of these and other observations, an hypothesis is proposed to account for the periodicity of fruit drop. It is suggested that, throughout its development, the fruit possesses an inherent tendency to separate from the spur but that, at certain periods, it is prevented from doing so by hormonal stimuli emanating from the developing seeds. Two such stimuli have been demonstrated, at 3-4 weeks and 7-10 weeks after petal-fall respectively, both of which are associated with particular developmental stages of the endosperm. In addition the existence of a third, as yet undetected stimulus at the time of fertilization is postulated. [Author's synopsis.]—Long Ashton Res. Stat.

1562. LUCKWILL, L. C.

Studies of fruit development in relation to plant hormones. II. The effect of naphthalene acetic acid on fruit set and fruit development in apples.

*J. hort. Sci.*, 1953, 28: 25-40, bibl. 10.

Alpha-naphthalene acetic acid (NAA) in aqueous solution was applied as a spray to branches of three varieties of apple at different times between green-cluster and 41 days after petal-fall. Observations were made on "initial" and "final" set of fruit, fruit drop, fruit weight and foliage damage. The addition of a wetting agent was found to have no influence on the effectiveness of the sprays. Applied at full bloom, NAA (20 p.p.m.) reduced the initial set of fruit but did not



increase the subsequent drop. A subsidiary experiment suggested that the reduction in set might be the result of incompatibility between the pollen tubes and the stylar tissue, induced by NAA. Post-blossom applications of NAA (20 and 50 p.p.m.) reduced the "final" set of fruit by increasing the early drop of fruitlets. This heavier drop resulted from seed abortion induced by NAA. Observations on Crawley Beauty suggested that cell wall formation in the endosperm defines the critical limit beyond which NAA is ineffective in increasing fruit drop. In all cases the increased drop, following spraying with NAA, was preceded by a period of one to two weeks during which no abscission occurred. NAA has a direct retarding effect on fruit growth and this tends to offset any increases in fruit size which might result from thinning. This effect is more marked the later the thinning spray is applied. In Miller's Seedling, branches thinned with NAA in the "on" year failed to differentiate fruit buds for the following year. A possible reason for this is the marked reduction in leaf area caused by the sprays on this variety, particularly when applied at full bloom. [Author's summary.]—Long Ashton Res. Stat.

1563. LJONES, B.

Forsøk med sprøyting med plante-hormon mot frukttall. (Spraying experiments with growth substances to prevent fruit drop.) [English summary 1½ pp.]

Forskn. Landbruk., 1952, 3: 93-125, bibl. 10, illus., being Meld. Inst. Fruktdyrk. Frukt-konserv. norg. LandbrHøgsk. 24, and Meld. St. Forsøksk. Njøs 14.

Observations on the fruit drop of many apple varieties are recorded for the years 1947-50. In a comparison of two plots (variety Filippa), to which potassium had and had not been supplied since 1939, it was found that K increased fruit drop markedly. This is attributed to an increase in fruit size due to K manuring, and possibly also to a shortening of the ripening period. Spraying trials with growth substances were carried out from 1946 to 1951 and the results are fully tabulated. The varieties used in these tests include some cosmopolitan ones. A third part of the paper deals with the histology of abscission. No relationship was discovered between the response of a variety to growth substance treatment and the anatomy of its fruit stalk. A physiological approach to the problem of differences in varietal reaction should, in the author's view, be more promising.

1564. ARMITAGE, H. M.

Effect of naphthylacetic acid on cherry fruiting. *J. econ. Ent.*, 1952, 45: 738.

Applications of 100 p.p.m. NAA to cherries, made after flowering and 30 days later, produced a hyponastic effect on the foliage, but did not appear in any way to affect the quantity or quality of the fruit.

1565. LANGER, C. A.

Effect of maleic hydrazide on the thinning of peaches during three successive years. *Quart. Bull. Mich. agric. Exp. Stat.*, 1952, 35: 209-13, bibl. 2.

Data are presented indicating that the fruit set of several varieties of peach can be reduced by maleic hydrazide at concentrations of 500 p.p.m. or above, without damaging the trees or foliage. In addition to a small difference in varietal response, factors affecting

the degree of thinning were plant vigour and stage of blossom.

1566. CRANE, J. C.

Ovary-wall development as influenced by growth-regulators inducing parthenocarp in the Calimyrna fig.

*Bot. Gaz.*, 1952, 114: 102-7, bibl. 4, illus.

Aqueous sprays of the ammonium salt of benzothiazol-2-oxyacetic acid, applied at concentrations ranging from 100 to 2,000 p.p.m., induced 100% of unpollinated Calimyrna fig syconia to develop parthenocarpically. This compound also promoted an acceleration in growth rate, so that, depending upon concentration, a certain percentage of the treated syconia matured 6 weeks before the caprifigged syconia. No observable symptoms of injury accompanied applications of 100 p.p.m., but above this concentration injury occurred in the form of chlorosis and ultimate death of the leaves and necrotic areas on the current season's wood. With the exception of differences in colour of the pulp and lack of embryos in achenes from parthenocarpic syconia, the latter could not be distinguished from syconia that had been caprifigged. In contrast to a complete absence of endocarp tissue in achenes from parthenocarpic syconia induced with gamma-(indole-3)-n-butyric acid and the presence of unclerified endocarp tissue in achenes from syconia induced with para-chlorophenoxyacetic acid [see *H.A.*, 20: 2352], histological investigations revealed this tissue to be completely sclerified in achenes from syconia induced with benzothiazol-2-oxyacetic acid. The external surface of syconia induced parthenocarpically with benzothiazol-2-oxyacetic acid was smooth, while that of caprifigged syconia was undulated. [From author's summary.]—Univ. Calif., Davis [see also *H.A.*, 22: 2197].

1567. RANGACHARLU, V. S., AND SAMBASIVA RAO, I. K.

"Oleification" of fig and its effect on fruit maturity.

*Sci. and Cult.*, 1952, 18: 244-5, bibl. 6.

The practice of treating young figs with olive oil goes back to ancient Greece and possibly further. As olive oil is not generally available in India the authors used linseed and sesamum oil in their experiments. They inserted a pointed wooden needle dipped in oil through the ostiole so that the oil was gently deposited into the syconium. Lot (1) received a single application of linseed oil, while lot (2) was treated with sesamum oil at weekly intervals up to the time of harvest. Treatment (1) hastened ripening by 16 days as compared with the controls, and treatment (2), apart from hastening maturity by 22 days, improved fruit size and quality as compared with the controls and lot (1). Further trials to standardize a simple technique for use in commercial plantings appear to be warranted.—Agric. Dep., Coimbatore.

*Marketing, storage and processing.*

(See also 1578.1.)

1568. SAMMET, L. L.

Efficiency in fruit marketing. Part VI.

*Calif. Agric.*, 1952, 6 (11): 11-12, illus., and 6 (12): 7-8, 11, illus.

Various forms of internal packing house transport—hand trucks, powered hand trucks, fork trucks and

types of gravity and powered conveyors—are compared as regards their seasonal costs and efficiency in Californian pear and apple packing houses. The labour cost for internal transport ranged from \$0.209 to \$1.140 per 1,000 lb. fruit handled, which was equivalent to a range of 3.7 to 16.1% of total direct labour costs. It is estimated that even in relatively efficient houses methods could be altered to save about 25% of internal transport costs.

1569. GERWE, R. D., AND SLADE, M. A.  
Pre-cooling fruits and vegetables by means of the Stericooler.  
*A.R. Veg. Gr. Ass. Amer.*, 1951, 1952,  
pp. 87-97, bibl. 8.

The Stericooler provides a very successful commercial means of removing the field heat from produce immediately after picking and packing. It is used not only for leafy vegetables but also for broccoli, cauliflower, beans, asparagus, sweet corn, apricots and peaches. The apparatus is 24 ft. 2 in. long, 8 ft. 4 in. wide and 8 ft. 6 in. high, and consists of a conveyor 18 ft. 7½ in. long by 6 ft. wide with a system of flood pans mounted above it (with a clearance of 2 ft.), and a tank containing 2,000 gal. cooled water mounted below it. Packed containers travel along the conveyor and are thoroughly flooded with water at 32-36° F. The speed of travel can be regulated. Examples of the cooling times for various products are: peas 7½, lettuce 12, cauliflower 17½, cabbage 20 and peaches 25 minutes.

1570. CARDINELL, H. A., AND BARR, C. G.  
Post harvest tests with peaches to reduce spoilage.  
*Quart. Bull. Mich. agric. Exp. Stat.*, 1952,  
35: 39-51, bibl. 6.

In this progress report on trials to improve the market quality of peaches the following results are recorded: Elberta peaches from one orchard were used for experiments in an attempt to compare the effectiveness of certain promising fungicides in the control of post-harvest decay. The effect of time of treatment made within 3, 19 and 29 hours of harvest was studied. All the selected treatments made within 3 hours of harvest showed promising reduction of decay. An attempt was made to determine the effect of fruit maturity as related to the treatment employed. Analysis of variance indicates that there was no significant difference between treatments on less mature ("hard-ripe") fruit. In the case of "firm-ripe" maturity, certain treatments were significantly different and promising. The stem-end of the fruit was found to be the most vulnerable place for the entrance of post-harvest rots. "Stericooling" without subsequent refrigeration reduced spoilage due to rot-causing organisms in the majority of dilutions of sodium hypochlorite.

1571. CARDINELL, H. A.  
Some effects of brushing and sulfur dusting of peaches on decay and shriveling.  
*Quart. Bull. Mich. agric. Exp. Stat.*, 1952,  
35: 34-8, bibl. 2.

Tests were carried out to determine the effect of brushing Elberta peaches—to remove objectionable pubescence—on the entrance of decay organisms. The data show that rot was slightly reduced by the treatment but that shrivelling was increased. Brushing and dusting with sulphur reduced loss from decay, as compared

with brushing alone or no brushing, and dusting with sulphur markedly increased the severity of shrivelling as compared with brushing and no brushing. Hydrocooling and treating with sodium hypochlorite in the "Stericooler" machine improved the control of decay and shrivelling. With fruit that had previously been brushed and dusted with sulphur, hydrocooling and reating with sodium hypochlorite in a "Stericooler" did not reduce decay or shrivelling so much as when peaches were brushed but not treated with sulphur.

1572. KIDD, F., AND WEST, C.  
The storage qualities of late dessert varieties of apples.  
*Tech. Pap. D.S.I.R. Food Invest.* 2, 1952,  
pp. 20, bibl. 12, 1s. 6d.

The behaviour in storage at 37° F. (2.8° C.) and at 31.5° F. (-0.3° C.) of twenty late dessert varieties of apple, including several Continental varieties, has been investigated. The varieties which appeared, on the whole, most promising are Barnack Beauty, Belle de Boskoop, D'Arcy Spice, Tydeman's Late Orange, Winston, and possibly the Swiss variety, Glockenapfel. These varieties were held in good dessert condition with little wastage at 37° F. (2.8° C.) until March, and on the basis of their behaviour in storage, can be recommended. D'Arcy Spice, Tydeman's Late Orange, Winston and Glockenapfel can be stored satisfactorily at 31.5° F. (-0.3° C.) until March or April, but the advantage gained by storing these at this lower temperature is not great. Barnack Beauty and Belle de Boskoop are susceptible to functional breakdown at this temperature. In the 1949-50 season two gatherings were made of each of the five home-grown varieties, the first at the normal time of gathering and the second about four weeks later. An appreciable increase in weight and a marked improvement in quality were shown by the fruit of the later gathering. On the other hand, the later gathered fruit had, on the whole, a slightly shorter life in storage at both temperatures. The date of gathering made no significant difference to the ascorbic acid (vitamin C) content of the fruit. Only a slight loss of ascorbic acid (vitamin C) occurred over a period of three to four months at either temperature. Belle de Boskoop had an outstandingly high content of vitamin C as compared with the other four varieties. This may be related to the fact that it is a triploid variety, and in this respect it agrees with the Bramley's Seedling among culinary varieties. [Authors' summary. For a preliminary account, see *H.A.*, 22: 193.]

1573. RUBIN, B. A., SOKOLOVA, V. E., AND  
ARCHIOVSKAJA, E. V.  
The adaptation of respiratory gaseous exchange of the apple to its environment.  
[Russian.]  
*Doklady Akad. Nauk S.S.S.R.*, 1952, 85:  
859-62, bibl. 4.

The respiration of the flesh and skin of growing and mature apples, variety Antonovka, in gaseous mixtures of 1% O<sub>2</sub>+99% N<sub>2</sub>, 5% O<sub>2</sub>+95% N<sub>2</sub>, 10% O<sub>2</sub>+90% N<sub>2</sub> and 21% O<sub>2</sub> (air) at 10°, 20° and 30° C. is discussed.

1574. RUBIN, B. A., AND OTHERS.  
The role of different oxidases in the respiration of apples. [Russian.]  
*Doklady Akad. Nauk S.S.S.R.*, 1952, 85:  
1123-6, bibl. 2.



The data from analyses of the skin and flesh of apples on the trees and in storage indicate that the adaptation of their respiratory processes to changing environmental conditions is due to the combined action of a number of oxidases which differ from one another in their various responses to external conditions.

1575. ULRICH, R., AND PAULIN, A.  
Accélération de la maturation des poires Passe-Crassane par action combinée de la chaleur et de l'éthylène. (Hastening the ripening of Passe-Crassane pears by the combined action of a warm storage temperature and ethylene.)  
*C.R. Acad. Agric. Fr.*, 1952, 38\*: 663-4, bibl. 1.

Preliminary experiments indicate that ethylene treatment (specified) at a storage temperature of 10° C. hastens the ripening of Passe Crassane pears without loss of flavour. Fruits picked on 22 October, 1951, and treated in this manner, reached maturity before Christmas.—Station Expérimentale du Froid de Bellevue, C.N.R.S.

1576. POULSEN, J. F.  
Om udnyttelsen af nedfaldsaebler ved ensilering. (The utilization of dropped apples for silage.)  
*Tidsskr. Planteavl*, 1952, 56: 60-6.

An account is given of two years' experiments carried out at the Department of Agricultural Chemistry of the Danish Laboratory for Plant Culture. Windfalls of two apple varieties were ensiled with clover and beet tops.

1577. CROSSA-RAYNAUD, P.  
De quelques problèmes posés en Tunisie par l'extension des plantations d'abricotiers en culture sèche. (Some problems arising in Tunisia from the expansion of the unirrigated cultivation of apricots.)  
*Tunis. agric.*, 1952, 53: 107-18, 121-8.

This article is chiefly concerned with the description and method of operation of a counter-current fruit dehydrator, with an intake capacity of 4½ tons of partially sun-dried apricots per 24 hours, suitable for installation in Tunisian plantations.

# Noted.

1578. a ALI, N.  
Terminology of fruits.  
*Punjab Fruit J.*, 1952, 15 (53): 21-7.  
73 fruits are listed, Urdu names being given where they exist.
- b ANON.  
De afzet van fruit in Frankrijk. (The marketing of fruit in France.)  
*Fruitteelt*, 1952, 42: 872-4, 890-2, illus.
- c CHEVALIER, A.  
Réflexions sur l'avenir de la culture des arbres fruitiers du groupe des pomacées et sur les possibilités de leur amélioration. (On the future of the growing of pome fruit trees and the possibility of their improvement.)  
*Rev. int. Bot. appl.*, 1952, 32: 533-47.  
A general article on crossing and grafting.

\* Printed as Vol. 39 in error.

- d DERMINE, E.  
La situation de nos variétés de pruniers. (Plum varieties in Belgium.)  
*Fruit belge*, 1953, 21: 11-16, bibl. 9.
- e FILINGER, G. A.  
Pruning fruit trees in Kansas.  
*Circ. Kans. agric. Exp. Stat.* 281, 1952, pp. 30, illus.
- f FJÄDERHANE, A. M.  
Redogörelse för ekonomiska undersökningar rörande fruktodlingen för åren 1939 och 1941-1944. (An economic study of fruit growing [in Sweden] in 1939 and 1941-44.) [English summary 2½ pp.]  
Reprinted from *Årsskr. Lantbr. Trädgårdshort.*, 1945 [?], pp. 223-72, bibl. 6, being *Medd. trädgårdsekon. Byrån* 2 [received November 1952].
- g HART, R.  
Cherry varieties at Kent Farm Institute.  
*A.R. hort. Educ. Ass.*, 1951, 1952, pp. 92-6.
- h JAKOVLIV, A. I. G.  
Réflexions sur les méthodes d'appréciation de la teneur en pectine des fruits. (Reflections on methods of estimating the pectin content of fruits.)  
*Fruit belge*, 1952, 20: 168-72, bibl. 9.
- i MOMMERS, J. F. A. M.  
De betekenis van de honingbij voor de bestuiving. (The importance of the honey bee in pollination [of fruit trees].) [English summary 7 lines.]  
*Meded. Dir. Tuinb.*, 1952, 15: 586-93.  
[See *H.A.*, 22: 3409.]
- j NERI, M.  
L'innesto del pero sul nespolo del Giappone. (Grafting pear on loquat.)  
*Riv. Fruttic.*, 1953, 15: 72.
- k READ, F. M.  
A census of Goulburn Valley canning fruit trees.  
*J. Dep. Agric. Vict.*, 1952, 50: 531-8, 572-6, illus.  
Peaches, pears and apricots.
- l STEWART, N.  
The grading and packing of apples and pears.  
*A.R. hort. Educ. Ass.*, 1951, 1952, pp. 97-9.
- m TAVERNIER, J., AND JACQUIN, P.  
Études sur un verger breton de variétés américaines de pommes de table. (Studies made on an orchard of American dessert apple varieties in Brittany.)  
*Ann. Amél. Plantes*, 1952, 2: 231-51, bibl. 23.
- n KRIEL, P. E., AND MICKLEM, T.  
The apricot industry [in S. Africa].  
*Decid. Fruit Gr.*, 1952, 2 (3): 15-16, bibl. 1.
- o THOMPSON, A. H., MARSH, R. S., AND SCHUBERT, O. E.  
A leaf analyses survey of apple orchards in West Virginia.  
*Bull. W. Va. agric. Exp. Stat.* 356, 1952, pp. 11, bibl. 12.

## SMALL FRUITS, VINES AND NUTS.

*Small fruits.*

(See also 1428, 1429, 1508, 1509, 1614e, f, 2371, 2398, 2400, 2404.)

1579. (BOLLEN, A. G.)

Tasmanian berry fruit industry.

Bull. Dep. Comm. Agric. Aust. 8, 1952, pp. 81, map.

This bulletin sets out in full detail the results of an economic survey summarized in an earlier paper [see *H.A.*, 22: 3479]. The fruits covered were raspberries, black currants, loganberries, gooseberries and strawberries.

1580. KRONENBERG, H. G.

Veredeling van kleinfruit in de Verenigde Staten van Amerika. I. (Small fruit breeding in the U.S.A. I.) [English summary 5 lines.] *Meded. Dir. Tuinb.*, 1953, 16: 39-52, bibl. 10, illus.

Een E.C.A. reis voor het klein fruit. (An E.C.A. tour for the study of small fruits [in the U.S.A.].) [English summary ½ p.] *Euphytica*, 1952, 1: 64-8.

In the first of these articles a review of the aims and methods of small fruit breeding in the United States is followed by a more detailed survey of the strawberry breeding programme there. In the second, while the strawberry receives most attention, blueberries, blackberries and raspberries are also considered.

1581. (MINISTER OF AGRICULTURE, CANADA.)

Sawdust mulching of small fruits and vegetables.

*A.R. Canada Minist. Agric.* 1951/52, 1952, pp. 78-9.

In tests at Saanichton, B.C., over a 4-year period a 3-inch surface mulch of sawdust increased boysenberry yields by 46% and with loganberry resulted in an annual increase of 2,754 lb. per acre in yield. Treatments given to carrots, spinach, tomatoes and cauliflower included a 2-inch sawdust surface mulch, a 1- and a 4-inch sawdust application incorporated with the soil, and 10 tons manure per acre. Except with tomatoes, sawdust gave the highest marketable yields. The 4-inch incorporated treatment permitted surface drying and caused poorer stands with field seeded crops.

1582. GILBERT, F. A.

The cultivated highbush blueberry. A relatively new fruit.

*Gdn J. N.Y. bot. Gdn*, 1951, 1: 135-6, 154 [received 1952].

A historical sketch on the cultivation of the blueberry is followed by brief notes on the ecology and breeding of the plant, and on the industry.

1583. BELL, H. P.

The growth cycle of the blueberry and some factors of the environment.

*Canad. J. Bot.*, 1953, 31: 1-6, bibl. 2.

The effects of latitude, burning, and pruning on the growth cycle of the blueberry (*Vaccinium angustifolium* var. *laevifolium*) were studied and found to be as follows. The morphology of the growth cycle and the sequence of morphological changes were not altered

by any of the factors considered. For spring and summer, a north and south difference of 150 miles had no greater effect than that which is regarded as "seasonal". Burning and pruning delayed the spring and summer growth by about two weeks. For the late autumn and early winter, there was some evidence that morphological changes occurred in the distal florets during that period, but for the "depth of winter", that is from mid-December till the end of February, the winter bud was a morphological complex that, with the exception of the apical floret, always had the same structure regardless of latitude, burning, or pruning, and this structure was the same as that found in normal plants during that season. [Author's abstract.]

1584. PHILLIP, A. G., AND KHAN, M. A.

Trials on the cultivation of the Cape gooseberry (*Physalis peruviana*).

*Punjab Fruit J.*, 1952, 15 (53): 17.

Trials began in the Punjab in 1946. The 1951-52 trials established that: (1) seedlings planted out in September-October on heavily manured ridges 1½-3 ft. wide give the best yields (9 maunds per acre); (2) frost protection is necessary; (3) irrigation every 8-10 days is essential and should be followed by hoeing and weeding until the plants have reached full size; (4) adequate winter shelter hastens fruiting by nearly a fortnight and harvesting can begin in mid-April.

1585. PRIEUR, B.

Framboisier et framboisière. (The raspberry plant and raspberry plantations.)

*Rev. d'Oka*, 1952, 26: 179-87.

Varieties recommended for cultivation in Quebec are Viking and Latham (the former less hardy), Marcy and Newburgh. Varieties introduced by the Ottawa Central Experimental Farm that merit large-scale trial are Gatineau, Madawaska, Muskoka, Ottawa, Rideau, Trent and Tweed.

1586. HYAMS, E.

Perpetual strawberries. The varieties discussed.

*Fruitgrower*, 1952, No. 2967, pp. 839-40.

The true perpetual fruiter flower in April/May, are de-blossomed, flower again in late June or early July, and thereafter production is more or less continuous until November. Four common varieties are: (1) Charles (Géant) Simmen which is recommended for the small grower using cloches and frames and concentrating on the September/October market; it has shown no virus symptoms in the author's garden; (2) Sans Rivale gives very large plants producing berries very suitable for jams and preserves; it has shown virus symptoms; (3) Triomphe is not considered a marketable variety, is very liable to botrytis and has shown symptoms that may be due to virus; and (4) St. Claude, an excellent berry for the dessert market; has shown no disease symptoms yet.

1587. GALLAY, R., BOVEY, R., AND PERRAUDIN, G.

La sélection du fraiser en Valais. (Strawberry selection in the Valais.)

*Rev. romande Agric. Vitic.*, 1953, 9 (1): 6-8, illus.

Lausanne Research Station has begun the selection of



the strawberry variety Madame Moutot for freedom from virus diseases. Healthy runners are to be distributed for propagation at high altitudes.

1588. ZIELINSKI, Q. B., AND GARREN, R., JR.  
Effects of beta-naphthoxyacetic acid on fruit size in the Marshall strawberry.  
*Bot. Gaz.*, 1952, **114**: 134-9, bibl. 3, being  
*Tech. Pap. Ore. agric. Exp. Stat.* **738**.

Beta-naphthoxyacetic acid, at various concentrations, was sprayed on strawberry fruits on 24 May, 1951, when the berries were approximately half grown. The following increases in fruit size at maturity were obtained over the controls: 10 p.p.m., no increase; 25 p.p.m., 16.5% increase; 50 p.p.m., 32.7% increase; 100 p.p.m., 25.9% increase. Fruit from a later crop of blossoms sprayed on 12 June, when the berries were slightly smaller than those of the first series, gave similar results except that the percentages of size increase were somewhat lower. Under the conditions of these experiments no harmful effects from the sprays were noted on either fruits or plants. Further investigations are required before the treatment can be recommended as a commercial practice.

### Vines.

(See also 1438, 1511, 1614a, c, g, i, j, k, l, m, n, 2385, 2398.)

1589. RIEMENS, J. M.  
De druiventeelt. (The cultivation of grapes [in Holland].) [English summary  $\frac{1}{4}$  p.]  
*Meded. Dir. Tuinb.*, 1952, **15**: 536-54, bibl. 16, illus.

A review is given of the development of the grape industry in Holland, the main varieties grown today, the export situation, factors affecting quality and the need to improve packing and transport.

1590. SERŽENKO, S. S.  
Viticulture in the new 5-year plan. [Russian.]  
*Sad i Ogorod*, 1952, No. 11, pp. 29-31.

The new Soviet 5-year plan demands a 50% expansion of vineyard areas and a 55-60% increase of vine yields. The regions for expansion, including the Far East and Siberia, are named and methods of obtaining higher yields through planting new, improved varieties, mechanization and pest and disease control are outlined.

1591. MOTOVILOV, D. S.  
The grape vine in Siberia. [Russian.]  
*Sad i Ogorod*, 1952, No. 11, pp. 32-4, illus.

At the Altai Experiment Station 7 methods of winter protection of vines were tested, and in all cases where organic materials such as dry leaves were included in the covering layer the plants overwintered successfully. In Siberia vines should be planted on southern or south-western slopes, sheltered from northern and north-eastern winds. The soil should be worked to a depth of 80 cm., manured at the rate of 50-70 t. per ha. with the addition of some mineral fertilizers. Early varieties should be used, planted deeply, so that the root system develops 40-80 cm. under the soil surface.

1592. GALLAY, R., BENVENIGNI, L., AND LEY-VRAZ, H.  
Vingt années d'expériences dans la culture et la vinification des cépages rouges. (Twenty years' observations on the cultural and oenological value of red grape varieties.)  
*Landw. Jb. Schweiz*, 1952, **1** (n.s.): 1087-94.

The authors summarize the results of their trials in the course of which they have tested some 200 red vine varieties at the experimental vineyard at Caudoz, Pully. Only 5 varieties earned the designation "very good" or "good" and it cannot be guaranteed that these would do equally well elsewhere in French-speaking Switzerland.

1593. VRYONIDES, P.  
New varieties of grapes.  
*Countryman, Nicosia*, 1952, **6** (10): 12-14.

Short descriptions are given of the following wine and table grape varieties recently introduced to Cyprus from Greece: Savatiano, Fileri, Aetonychi White, Aetonychi Red, Aetonychi Black, Edessa Late, Karidato, Petinos (Cock), Ohanez (Almeria), Moscouidi, Rombola, Migdali, Skiadopoulo, and Vertzami.

1594. HUSFELD, B.  
Prospects of obtaining resistant vine varieties of good quality. [German.]  
*Dtsch. Weinb.*, 5 Oct., 1952, from abstr. in  
*Bull. Off. int. Vin*, 1952, **25**: 65-70.

Work at Geilweilerhof, Germany, has shown that the prospects of combining quality with mildew resistance in vines are good. The genetics of these characters and the wines from some new resistant varieties are discussed.

1595. TAVADZE, P. G.  
The accumulation of pigments in vine leaves in relation to the phases of development during the year. [Russian.]  
*Doklady Akad. Nauk S.S.S.R.*, 1952, **85**: 1395-8, bibl. 25.

The chlorophyll, xanthophyll and carotene contents of vine leaves were determined during four periods of growth, viz. (1) at flowering, (2) as the fruit was swelling, (3) at the beginning of fruit ripening and (4) when the fruit was ripe. Three varieties of *Riparia rupestris* rootstocks were examined.

1596. WEGER, N.  
Die Sonnenscheindauer in Geisenheim und ihr Einfluss auf die Weingüte. (Hours of sunshine at Geisenheim and their influence on wine quality.)  
*Ber. dtsh. Wetterdienst. U.S. Zone* **42**, 1952, pp. 190-4, bibl. 7.

The correlation coefficient between total hours of sunshine from April to October and wine quality was calculated to be  $r=0.694$  for the period 1890-1951. This figure shows sunshine to be the most important factor affecting vintage quality.

1597. ANON.  
Onderstammen bij druif. (Rootstocks for vines.)  
*Meded. Proefst. Groent. Fruit. Glas*, 1953, No. 1, pp. 2-3.

Brief notes, based on observations in commercial holdings in Holland, are made on the performance of Foster's White Seedling, Frankentaler, Gros Colman,

Gros Maroc and Black Alicante when used as rootstocks.

1598. VEGA, J.

Acerca de un nuevo procedimiento de injertación herbácea. (A new method of herbaceous grafting of vines.)

*Idia*, 1952, 5 (53): 34-5, illus.

Developed at the Mendoza National Experimental Station since 1945, the method employs 2-year-old rooted cuttings of rootstock varieties. At least a month before grafting, vigorous well-placed side-shoots are selected, the number depending on the condition of the rootstock, and the remainder are removed. Whip-grafting takes place 35 cm. from the base of these side-shoots, their secondary shoots (but not adult leaves) being removed beforehand. Shoot removal is repeated at intervals until the graft takes the lead. Two months after grafting, the 2 basal nodes of the grafted side-shoots are earthed up to stimulate rooting. For greater certainty in rooting the basal internode is either ringed or wired. In the winter the newly grafted, rooted shoots are removed and the following spring grafting takes place again on shoots arising from adventitious buds. Thus economy is effected by combining in one plant the functions of rootstock and nursery. Up to 10 grafts per plant are obtainable.

1599. SINGH, L. B., AND DIKSHIT, N. N.

Studies in introducing earliness in maturity of grapes (*Vitis vinifera*, Linn.). I. Effect of early pruning on the growth of vines and maturity of fruits.

*Ind. J. Hort.*, 1952, 9 (3): 20-5, bibl. 9.

Early pruning (10 November instead of the 4th week in December) of 9 vine varieties adversely affected yield and vigour without advancing maturity.—Horticultural Research Station, Saharanpur, U.P.

1600. (LAUSANNE, STATION FÉDÉRALE.)

Techniques viticoles. (Vine pruning.)

*Landw. Jb. Schweiz*, 1952, 1 (n.s.): 970-1.

The annual report for 1951 of the Swiss Agricultural Research Stations Mont-Calmé and Montagibert, Lausanne and Pully, contains tabulated data on the effect of several pruning treatments applied to the red Chasselas Fendant vine on length of shoot, flowering, diameter of the berry, time of ripening and harvest, and must quality.

1601. DROUINEAU, G.

Utilisation du lupin comme engrais vert d'hiver dans les vignobles et les vergers en sols non calcaires. (Lupins as a winter green manure crop in vineyards and orchards on non-calcareous soils.)

*Ann. agron. Sér. A*, 1951, 2: 596-8, illus. [received 1953].

Several years' trials in peach orchards have shown that a winter crop of lupins has a favourable effect on the trees. In vineyards lupins were found to give protection against soil erosion on slopes in winter.—Antibes.

1602. LONGCHAMP, R., ROY, M., AND GAUTHERET, R. J.

Recherches sur l'action du 2-4 D et du M.C.P.A. sur la vigne. (The action of 2,4-D and MCPA on vines.)

*Ann. agron. Sér. A*, 1951, 2: 849-56, bibl. 9 [received 1953].

In small-scale trials in Champagne vines were sprayed with the sodium salts of 2,4-D and MCPA at rates ranging from 0.3 g. to 100 g. active substance per hectare. Examinations of the treated rows in June, July and September showed that dosages under 10 g./ha. did not cause any appreciable injury. Provided some precautions are taken, the danger of drift resulting from applications in fields adjacent to vineyards is considered slight, except when the ethyl ester of 2,4-D is used.

1603. WEAVER, R. J.

Response of Black Corinth grapes to applications of 4-chlorophenoxyacetic acid.

*Bot. Gaz.*, 1952, 114: 107-13, bibl. 4, illus.

Clusters and foliage of Black Corinth grapes were sprayed with 4-chlorophenoxyacetic acid at concentrations of 10, 25, 50, 100 or 300 p.p.m. Large berries and compact clusters developed when the acid was applied in the range from 10 to 50 p.p.m. Dipping of clusters gave similar results. Dip applications at 50 p.p.m. resulted in berries as large as those produced after both girdling and application of growth regulator. It was found in 1951 that to obtain compact clusters with almost no hard seeds spraying should not be done before 3 June. Only the parts of clusters actually treated with growth regulator usually developed large berries with thickened pedicels. The compound, or stimulus induced by it, apparently failed to move from the treated area to any appreciable degree.—Univ. Calif., Davis.

1604. WURGLER, W.

Coulure de la vigne et traitements auxiniques. (Berry drop in vines and its treatment with auxin.)

*Landw. Jb. Schweiz*, 1952, 1 (n.s.): 1067-75, bibl. 16.

The potassium salt of  $\beta$ -naphthoxyacetic acid improved fruit set in some vine varieties and was detrimental in others. The conditions governing the effect of the treatment proved so complex that the author abandoned this line of research.—Lausanne.

## Nuts.

(See also 1511, 1512, 1513, 1614b, d, h, 2371.)

1605. TALBERT, T. J.

Nut tree culture in Missouri.

*Proc. 41st annu. Mig north. Nut Grs' Ass.*, 1950, Pleasant Valley, N.Y., pp. 134-44 [received 1953].

Notes are given on black walnuts, butternuts, pecans, with special reference to varieties, hickories, chinkapins, filberts and hazelnuts.

1606. EVREINOFF, V. A.

Quelques observations biologiques sur l'amandier. (Some biological notes on the almond tree.)

*Rev. int. Bot. appl.*, 1952, 32: 442-59, bibl. 7.

This general article briefly covers the following subjects: the origin of the cultivated almond, the almond in cultivation, soil, climate, altitude, flowering and pollination, selection, the sweet almonds, genetic relationship between the sweet and the bitter almonds, propagation, culture. Successful cultivation depends



upon wise choice of varieties and pollinators, the presence of bees in the orchard, adequate spacing (from 70 per ha. with 300-400 mm. rainfall to 400 with 600-800 mm.), a deep permeable calcareous soil, choice of hard-shelled varieties for preference (as being the most fertile and most hardy), avoiding the cultivation of bitter almonds, proper soil management and manuring, and light pruning.

1607. SCHAD, C., AND OTHERS.

Recherches sur le châtaignier à la Station de Brive. (Sweet chestnut research at Brive.) *Ann. Amél. Plantes*, 1952, 2: 369-458, bibl. 39, illus.

Owing to the devastation of ink disease (*Phytophthora cambivora* and *P. cinnamomi*) and blight (*Endothia parasitica*) the area under chestnuts in France in 1948 was only 45% of the acreage in 1882. This decline is of great economic importance, the chestnut growing provinces having lost a higher percentage of their population to the towns than have other areas. The aim of the Station d'Amélioration du Châtaignier established at Brive in 1946 was to breed for disease resistance combined with vigour and ecologically desirable characters. As a first step the flower biology of *Castanea sativa*, *C. crenata* and *C. mollissima* was studied with the result that the existence of protandry (physiological, sometimes also morphological), of limited receptivity of the stigma, of male and female sterility (morphological and physiological), of inter-varietal and inter-specific compatibility and finally of general self-sterility was established. Plants raised from hybrid seed flowered in the second year so that the breeding and selection work, which is described in detail, proceeded at a promising rate. At the time of writing the following material was available: (1) 65 hybrids resistant to ink disease resulting from crosses of the three *Castanea* species; these hybrids are now being propagated vegetatively on a large scale. (2) 1,610 plants sufficiently resistant to ink disease resulting from free pollination; these will be used for seed production. (3) 100 *C. sativa* plants selected for the combination of resistance to ink disease and to late spring frosts. The breeding work for resistance to blight has not, as yet, had any tangible results [see also *H.A.*, 23: 424].

1608. GRAVES, A. H.

Chestnut breeding work: report for 1950. *Proc. 41st annu. Mtg north. Nut Grs' Ass.*, 1950, Pleasant Valley, N.Y., pp. 145-8, illus. [received 1953].

During the year 103 crosses were made in Connecticut. The principal combination was a cross of Japanese chestnut with Chinese-American or American-Chinese, a mixture that in recent years has given excellent results. A considerable part of the work was undertaken for the benefit of the Italian authorities and material was also sent to France.

1609. SMITH, G. L.

Our experience with hickory nut varieties. *Proc. 41st annu. Mtg north. Nut Grs' Ass.*, 1950, Pleasant Valley, N.Y., pp. 120-5 [received 1953].

Of the 30 hickory varieties described and listed in order of ripening, 13 are considered well worthy of propagation.

1610. MAURER, K. J.

Erfahrungen mit einigen deutschen und ausländischen Walnuszsorten. (Observations made on some German and foreign walnut varieties.)

*Züchter*, 1952, 22: 276-84, illus.

A description and provisional evaluation is given of grafted walnut trees of 39 varieties originally selected by E. Schneiders\* from about 1,600 forms grown in Germany. Approximately half these descriptions are accompanied by illustrations of the nut. The foreign varieties included in this study have generally accepted names, while the German types are still designated by numbers.—Inst. f. Obstbau, Geisenheim.

1611. TYMKO, M. M.

The walnut in shelterbelts and nut groves.

[Russian.]

*Doklady vsesojuz. Akad. sel'sk. Nauk*, 1952, 17 (6): 19-22, illus.

In Moldavia, both in shelter belts and groves, walnuts, *Juglans regia*, should be sown *in situ*, either in spring or in autumn. In the spring stratified seed is sown at a depth of 6-8 cm.; in the autumn fresh dried nuts, previously treated with BHC for rodent control, are sown at a depth of 10-12 cm. In the shelter belts the trees are grown in groups, and often in both types of planting intensive cover cropping is practised after the first 2 years. The care of walnuts is simple as they are only seldom attacked by pests or diseases and pruning consists of removing dead or overcrowded branches. The dead wood of walnuts, as distinct from other trees, should not be removed in the spring, but at the end of July or in early August.

1612. DOROFEEV, P. P.

The walnut in shelter belts. [Russian.]

*Sad i Ogorod*, 1952, No. 10, pp. 9-12.

For shelter belts in Moldavia frost and drought resistant walnuts of good quality are used. They are sown *in situ* early in the spring in groups 5 m. apart, the distance between the rows also being 5 m. The preparation of the land is described, and other woody species including fruit trees planted with the walnuts are listed. The young seedlings are regularly rogued, the final stand being in groups of 2-3 with 10×10 m. between groups.

1613. BURLINGAME, B. B.

Walnut harvesting. Methods, equipment and costs.

*Circ. Calif. agric. Exp. Stat.* 416, 1952, pp. 24, illus.

Harvesting methods discussed are: knocking and shaking—by hand, from towers, with cable or boom shakers; picking—by hand, hand-rake, canvas sheets, mechanical.

Noted.

1614.

a AUSTRALIA.

*Twenty-eighth Annual Report of the Commonwealth Dried Fruits Control Board for the year 1951-52*, Melbourne, 1952, pp. 20.

Currants, sultanas and lexias.

\* See *Der neuzeitliche Walnussbau*, 1947, 2nd edition.

- b CLARKE, W. S., JR.  
Progress in nut culture at the Pennsylvania State College.  
*Proc. 41st annu. Mtg north. Nut Grs' Ass., 1950*, Pleasant Valley, N.Y., pp. 132-4 [received 1953].
- c DEPARDON, L., AND BURON, P.  
Le vignoble et les vins de Loir-et-Cher. (Vineyards and wines of the Loir-et-Cher.) *Ann. agron. Sér. A*, 1951, 2: 857-69 [received 1953].
- d GELLATLY, J. U.  
Experiments with tree hazels and chestnuts. *Proc. 41st annu. Mtg north. Nut Grs' Ass., 1950*, Pleasant Valley, N.Y., pp. 118-20 [received 1953].  
4 *Corylus* and 3 *Castanea* species in British Columbia.
- e HANSON, K. W.  
The inbreeding and outbreeding behavior of certain strawberry clones with respect to ascorbic acid content of the fruit and fruit size.  
*Dissert. Abstr.*, 1952, 12: 292-3.
- f KRONENBERG, H. G.  
Veredelingswerk met aardbeien op het Instituut voor de Veredeling van Tuinbouwgewassen. (Breeding work on strawberries at the Institute of Horticultural Plant Breeding at Wageningen.) [English summary  $\frac{3}{4}$  p.]  
*Meded. Dir. Tuinb.*, 1952, 15: 522-35, illus.
- g LEVADOUX, L.  
Particularité de la culture des raisins de table. (The cultivation of table grapes.) *Agriculture, Paris*, Sept. 1952, from abstr. in *Bull. Off. int. Vin*, 1952, 25: 83-5.
- h MINISTRY OF AGRICULTURE, LONDON.  
Cobnuts and filberts.  
*Adv. Leaflet. Minist. Agric. Lond.* 400, 1952, pp. 7, illus., 2d.  
Includes a recommendation of 5 varieties.
- i DE MOS, D.  
De snoei van de druif. (The pruning of grapevines [under glass].) *Fruiteelt*, 1952, 42: 942-3, illus.
- j NAVARRO, A. F., AND VASCONCELLOS, J. DE C.  
Taxonomic characters of the genus *Vitis* and the identification of its species. [Spanish.] *Vinos, Vinas y Frutas*, July 1952, from abstr. in *Bull. Off. int. Vin*, 1952, 25: 71-2.
- k PEYER, E., AND HUBER, H.  
Die Imprägnierung von Rebstecken. (The treatment of vine stakes with wood preservatives.) *Schweiz. Z. Obst- u. Weinb.*, 1952, 61: 514-17, illus.
- l TURKOVIĆ, Z.  
Erfahrungen mit Hochkulturen. (Observations on high training of vines [in Croatia].) [English summary 7 lines.] *Mitt. Klosterneuburg*, 1953, 3: 15-26.
- m VENKATARATNAM, L., FAROOQI, M. M., AND CHELLAPPA, T.  
The Anab-E-Shahi grapevine and its culture in Hyderabad State.  
*Ind. J. Hort.*, 1952, 9 (3): 12-15, illus.
- n ZULUAGA, P. A., MORETTI, R., AND JULCH, J. A.  
Experiments on the acclimatization of American vines in Argentina. [Spanish.] *Vinos, Vinas y Frutas*, July 1952, from abstr. in *Bull. Off. int. Vin*, 1952, 25: 72-5.

## PLANT PROTECTION OF DECIDUOUS FRUITS.

## General.

(See also 1754c, 1771-1777, 2369.)

1615. (MINISTER OF AGRICULTURE, CANADA.)  
Control of insect pests and of fungal and deficiency diseases of fruit trees.  
*A.R. Canada Minist. Agric. 1951/52*, 1952, pp. 31-3.  
*Apple scab*: Geneva, Antonovka, Petrel, O-201 and O-265 were found to be resistant, and Alexis, O-183, O-185 and O-266 susceptible. *Apple crown rot*: 2-year-old trees of various spp. were inoculated with *Phytophthora cactorum*; Malling IV apple rootstocks, Bartlett pear, *Pyrus robusta* and mahaleb cherry were resistant; Gold cherry was susceptible; mazzard cherry clonal stocks and seedlings varied widely in their reactions. *Pear fireblight*: Seven applications each of a weak bordeaux spray (1-1½-100) and a 20-80 copper-lime dust were made on separate blocks of 60 pears. Results were 4, 7 and 283 (on 40 control trees) infections respectively. *Physiological disorders*: Mn deficiency in the Okanagan Valley was readily cured by manganous sulphate sprays. Zn deficiency was recognized for the first time in pear, peach, prune and cherry and was

cured by Zn oxide as a summer foliage spray. Field measures against Mg deficiency, which causes leaf blotch in apples in the Okanagan Valley, were successful for the first time in 1951 when trees sprayed 5 times at 10-day intervals with a 2% solution of Mg sulphate had no leaf blotch at the end of the season while controls were seriously affected. *Codling moth*: In tests of concentrate sprays in British Columbia DDT emulsion caused injury, and a 50% wettable powder showed less tendency to cake than a 90%. Dilan was comparable with DDT in effectiveness. Methoxychlor, much less toxic to vertebrates than DDT, gave good results for the 3rd year. Laboratory experiments showed that temperature and R.H. in the orchard may have an important bearing on larval entry into fruit. Tests in Ontario with DDT concentrate sprays against adults are described. *Concentrate sprayers*: Among those tested the best for fineness of spray, uniformity of coverage, and carrying power, was a machine with a turbine-type, axial flow blower developing 110 m.p.h. air velocity. In tests, a machine with an air blast of 15,000-20,000 cu. ft. per minute at 90-100 m.p.h. delivered on one side, and a total capacity of 5-15 gal. per minute, was satisfactory for large acreages of mature apple trees, while for small trees or small



acreages of fairly large trees a machine delivering 8,000 cu. ft. per minute at 90 m.p.h. was suitable.

*Disturbances of nutrition or of unknown origin.*

(See also 1444, 1480-1482, 1488, 1503f, i, 1522, 1578o, 2392.)

1616. GACHON, L., AND COLLIER, D.  
Contribution à l'étude du diagnostic foliaire du pommier. (A contribution to the study of leaf diagnosis in apple.)  
*Ann. agron. Sér. A*, 1951, 2: 550-3 [received 1953].

The data show that the diagnosis of mineral deficiency in apple by leaf analysis should be carried out on leaves collected in August from the short lateral shoots of fruit spurs in the centre of the top.—Clermont-Ferrand.

1617. BURRELL, A. B., BOYNTON, D., AND CROWE, A. D.  
The boron content of McIntosh apple leaves and fruits in relation to symptoms and methods of application.  
From abstr. in *Phytopathology*, 1952, 42: 464.

Leaves collected in summer from boron-deficient trees contained less than half the boron in leaves from trees that had received six annual narrow-ring soil applications of borax or  $H_2BO_3$ . Leaves from trees receiving excessive boron applications, causing chlorosis, contained up to 200 p.p.m. Less boron was absorbed when broadcast than when restricted to a ring beneath the branches. Among fruit tissues, the endocarp had the highest B concentration, the skin, the fleshy ovary and the seeds somewhat less, and the floral tube the least.

1618. CHINO, T., AND OTHERS.  
Effects of boron on the "Ebi" disease of grapevines. (1). [Japanese with English summary  $\frac{1}{2}$  p.]  
*J. hort. Ass. Japan*, 1952, 21: 87-92, bibl. 20, illus.

The "Ebi" disease of vines is characterized by poor berry set and seed development and chlorosis of the leaves. Applying sprays of 0.3% boric acid to leaves or flower clusters or both, 1 and 3 weeks before blooming, decreased the number of abnormal flowers, improved fruit set and more than doubled the weight of fruit bunches. The treatment also improved pollen germination, increased both the average number of seeds per berry and the percentage of abnormal seeds, and enhanced the development of vascular strands in the fruit stalk, but it did not correct the leaf mottling or increase the growth of young canes.

1619. ABADIA, A.  
Deficiencia inducida de hierro en frutales. (Iron deficiency in fruit trees.) [English summary 3 lines.]  
*An. Edaf. Fis. veg. Madrid*, 1952, 11: 641-50, bibl. 8, illus.

Iron deficiency in fruit trees is common and serious near Zaragoza on riverbank soils with a pH about 7.8, and a high lime and low organic matter content. Successful experiments in its cure by injection and spraying with  $FeSO_4$  are described. In the latter the soil had a pH of about 8.4, a lime content of about 35%

and an organic matter content of 2.78-3.31%. Spray concentrations from 0.1 to 0.5% were used. The best was 0.15% which resulted in complete disappearance of the symptoms without any damage to the leaves. 0.5% injured many leaves.—Aula Dei Exp. Stat.

1620. DEPARDON, L., AND OTHERS.  
Fumure des arbres fruitiers. (The manuring of fruit trees.)  
*Ann. agron. Sér. A*, 1951, 2: 702-11 [received 1953].

It was shown by leaf analysis that the decline of apples and gooseberries around Versailles is due to potassium deficiency. The statistical evaluation of manurial treatments of cider apples near Rouen is discussed in some detail.

1621. BRYNER, W., AND KUNDERT, J.  
Spritzversuche zur Bekämpfung der Zinkmangelkrankheit im Obstbau. (Spraying trials for the control of zinc deficiency in fruit trees.) [French summary  $\frac{1}{2}$  p.]  
*Landw. Jb. Schweiz*, 1953, 2 (n.s.): 87-100, bibl. 12, illus.

In 1942 one apple orchard at Wädenswil Research Station began to exhibit symptoms of a malady closely resembling zinc deficiency, as described in the literature. In 5 years of spraying trials zinc sulphate was applied to the tops of 66 trees which, as a rule, showed a distinct and rapid improvement. In a few cases, however, the trees continued to deteriorate in spite of the treatment, while some slight improvement was noted in untreated controls. These observations suggest that some unknown factors are involved in the condition of the trees.

1622. WILSON, E. E.  
Development of bud failure in the Jordanolo variety of almond.  
From abstr. in *Phytopathology*, 1952, 42: 520.

The Jordanolo almond (Nonpareil  $\times$  Harriott) is affected by a bud failure disorder which is probably non-transmissible by grafting but is scion-perpetuated and is increased by vegetative propagation. Certain trees exhibit bud failure in a few branches only; others exhibit it in all branches. Young trees develop symptoms more rapidly than mature ones and symptom development may become more or less static after 12 to 15 years, but, if mature trees are forced into vigorous growth by severe pruning, bud failure develops as rapidly as on young trees.

1623. SCHAD, C., AND GRENTÉ, J.  
Le dépérissement du pommier. (A decline of apple trees.)  
*C.R. Acad. Agric. Fr.*, 1952, 38\*: 571-4, bibl. 3.

Irrigated apple orchards under grass, chiefly Canada Reinette, in the Massif Central region exhibit many symptoms of a pronounced decline: the annual shoots do not make any growth, and the leaves are fewer, pale and curled. Before they finally die the trees produce large crops of small-sized fruits. An examination of the root system showed that affected trees do not form fresh rootlets and have scarcely any root hairs. Moreover, many roots of about 1 cm. diameter had brownish

\* Printed as Vol. 39 in error.

lesions from which, among many other fungi, a *Fusarium* sp. and a *Ramularia* sp. were consistently isolated. Inoculations with these two species again produced lesions, though only after some time. Observations suggest that the fungi are weak parasites which may live also saprophytically in the soil. The rootstocks EM.IX and Noir de Monton were found to be particularly susceptible. A plentiful supply of organic manure but not artificial fertilizers kept the trees healthy or, when applied to affected trees, counteracted the effect of the fungi by inducing new root growth. The beneficial action of the manure is largely attributed to its growth substance content, which promotes the formation of roots. It is thought that lack of oxygen in the irrigated clay soils and absorption by the grass roots of super-ficially applied fertilizers may have predisposed the apple roots to fungal attack.—Station d'Amélioration des Plantes du Centre de Recherches Agronomiques du Massif Central.

### *Climatic factors.*

(See also 1502, 1516, 1521, 1532, 1754d, h.)

1624. URE, C. R.

**Hardiness research problems in prairie Canada.**

*Rep. Proc. 8th annu. Mtg west. Canad. Soc. Hort.*, 1952, pp. 31-6.

A summary is given of answers received to a 5-point questionnaire submitted to 21 prairie workers. The information sought related to: 1. The most urgent problems in hardiness. 2. Periods of extensive cold injury and type of plant (fruit, ornamental) affected. 3. Experiments relating to cold hardiness conducted. 4. Equipment or special facilities available for hardiness studies. 5. Soil analyses of areas from which plant behaviour is reported.

1625. ATKINSON, J. D.

**Revised list of temperatures dangerous to Moorpark and Roxburgh Red apricots.**

*Orchard. N.Z.*, 1952, 25 (9): 13, bibl. 1.

From the results of artificial freezing trials on blossom and fruit on detached twigs, confirmed subsequently in an orchard, critical low temperature levels have been established for these two apricot varieties. The temperatures at which orchard heaters should be lit are indicated for the various stages of blossom and early fruit development.

1626. WEINBERGER, J. H.

**Winter injury to peach trees on Yunnan stock.**

*Plant Dis. Repr.*, 1952, 36: 307-8, bibl. 2, illus.

A rootstock trial was started in the spring of 1948 with 15 trees each of 6 peach varieties on Yunnan and the same number on Lovell stocks. The former, coming from China, is of interest as being resistant to the root-knot nematode, *Meloidogyne incognita*, though it is susceptible to *M. javanica*. The trees grew moderately well until the spring of 1951 when 14 of those on Yunnan stock showed severe winter injury, and further similar damage was seen in the spring of 1952. Summarizing the two seasons' data it was found that 91% of the trees of all varieties on Yunnan stock were

winter-killed, and 7% of those on Lovell.—U.S. hort. Field Lab., Fort Valley, Ga.

1627. VARTANJAN, M. D.

**Frost resistance in vines depends on changes in biochemical composition.** [Russian.]

*Vinodelie i Vinogradarstvo*, 1952, No. 11, pp. 43-6.

The maturity and frost resistance of the vine is determined by its sugar content. At the end of the season mature wood should have a sugar: total starch ratio of at least 1:2, this ratio being increased during the cold weather by the transformation of starch into sugar. Trials were conducted in Uzbekistan to ascertain the best methods of obtaining high starch contents at the beginning of dormancy, the conversion of which into sugar proceeds right through the winter up to the end of February. It was found that vines topped in early and late summer, and receiving full fertilizer treatment in early spring and P and K side dressings in June and late July, had a higher sugar content in January than those treated by any other method. A supplementary irrigation trial has shown that 4 water applications during a season produce better matured wood than 7 applications. The method of training is stated to have no apparent effect on the maturation and sugar content, i.e. frost resistance, of vines.

1628. PAINTER, J. H.

**Observations on effects of low temperatures in winter 1949-1950 on walnuts and filberts in Oregon and Washington.**

*Proc. 41st annu. Mtg north. Nut Grs' Ass.*, 1950, Pleasant Valley, N.Y., pp. 109-13 [received 1953].

With the possible exception of southern Oregon, all walnut trees grown in the two States suffered some injury during the very severe winter of 1949-50. Factors contributing to the frost damage sustained were: low elevation, advanced age of trees, heavy crops the preceding year and low level of nutrition. Of the two varieties studied in Oregon, Mayette seemed to have generally withstood the low temperatures better than Franquette. Carpathian seedling walnuts appeared resistant to frost, and when injured soon recovered. Filberts on the whole were more tolerant of frost than walnuts.

1629. GELLATLY, J. U.

**Effects of the winter of 1949-50 on nut trees in British Columbia.**

*Proc. 41st annu. Mtg north. Nut Grs' Ass.*, 1950, Pleasant Valley, N.Y., pp. 113-15 [received 1953].

The official minimum temperature recorded around Okanagan Lake during the season was  $-22^{\circ}$  F. Heartnuts, and Calendar heartnut (*Juglans sieboldiana cordiformis*), and butternut (*J. cinerea*) hybrids overwintered remarkably well and carried a good crop the following summer. Young bushes of the 11 varieties of filbert observed were found frost resistant, but the older plants suffered injury. Damage on walnuts varied, the variety Broadview being the most hardy.

1630. MORTENSEN, E.

**Influence of mild winters on peaches and other deciduous fruits in South Texas.**

*Proc. 7th Annu. Rio Grande Valley hort. Inst.*, 1953, pp. 12-17, bibl. 6, illus.



The examination of 16 years' yields of peaches and other deciduous fruits and of climatic records in south Texas show that blossoming, fruit set and yields are influenced by several different factors and not merely by high winter temperatures. There was a trend towards poor crops following winters with unusually high mean temperatures and high sunshine and *vice versa*. Relative humidity did not appear to have any effect. The performances of 95 varieties of apple, apricot, cherry, peach, pear, plum and walnut are summarized. Varieties adapted to mild winters in southern California are not necessarily adapted to mild winters in south Texas.

1631. CHARIAL, M.

Accidents physiologiques affectant les espèces fruitières tempérées en climat tropical et subtropical. Méfaits des hivers trop doux. Moyens de lutte. (Means of overcoming the effects of a mild winter on temperate fruit trees grown in the tropics.) *Fruits d'Outre Mer*, 1953, 8: 22-6.

Three methods of overcoming the effects of a mild winter on temperate fruit trees grown in the tropics are discussed in this review article. (1) *The use of resistant varieties* is considered the best method. A list of resistant peaches, plums, apricots, pears and apples is given. (2) *Cultural practices*. Generally speaking anything which reduces tree vigour also diminishes its reaction to unfavourable climatic factors. Nevertheless, very severe pruning which induces long shoot formation should be avoided. In North Africa and in India irrigation is stopped after harvest to induce dormancy. Again, protection of the tree from direct winter sunlight either by natural phenomena such as mists or by whitewashing is found useful. (3) *Special measures to break dormancy*. Notes are given on the application of whitewash, linseed oil, seal oil or mineral oils with and without the addition of a dinitro compound.

1632. FRITZSCHE, R.

Abnorme Erscheinungen am Lagerobst. (Disorders of stored fruit.) *Schweiz. Z. Obst- u. Weinb.*, 1952, 61: 499-503, illus.

Two physiological disorders seen on certain varieties of apple in Switzerland, and attributed to abnormal weather, are described in relation to the storage quality of the fruit. One of these, showing as a reddish discoloration of the lenticels on the sides exposed to the sun some weeks before picking, does not detract from the keeping properties. The other disorder, not apparent at picking, is a brown speckling which appears after the fruit is stored and gives rise to rotting; these spots appear either at lenticels or at small cracks in the skin and are not confined to the side exposed to the sun. They are probably a result of cold wet weather following intense summer heat. Mention is also made of drought spot and soggy breakdown.

1633. BAUER, W.

Der Windfaktor im Obstbau. (The wind factor in fruit growing.) *Ber. dtsh. Wetterdienst. U.S. Zone 42*, 1952, pp. 352-8.

A study of wind velocities and their effect on the growth of fruit trees in several localities of the Odenwald.

1634. LAUBER, H. J.

Die nordische Vogelbeere als Windschutzpflanze für Obstanlagen. (*Sorbus intermedia* as shelter trees for orchards.) *Schweiz. Z. Obst- u. Weinb.*, 1952, 61: 521-3, illus.

The article is based on experiments made in Denmark where *Sorbus intermedia* is frequently used in shelter belts for fruit plantations.

1635. ZAHAROVA, E. I.

The effect of lightning on the vine. [Russian.] *Vinodelie i Vinogradarstvo*, 1952, No. 11, pp. 35-6, illus.

Wilting and subsequent drying up observed in vineyards was found to be caused by lightning, which struck the supporting stakes. The most serious damage is caused in trellised vines where often whole rows are burned out. In areas where thunderstorms are frequent it is recommended to earth the wooden supporting frames, or replace them by metal frames.

Viruses.

(See also 1754i, k, n, p.)

1636. THUNG, T. H.

Herkenning en genezing van enige virusziekten. (Diagnosis and cure of some virus diseases.) [English summary 10 lines.] *Meded. Dir. Tuinb.*, 1952, 15: 714-21.

Various methods of diagnosing virus diseases that have recently been reported in the literature were tested at the Institute of Phytopathological Research, Wageningen. It was found that the diagnostic methods of KenKnight [see *H.A.*, 22: 301], of Lindner *et al.* [see *H.A.*, 22: 1334] and of Hino were unsuitable for diagnosing the virus diseases of raspberries, cherries and strawberries that occur in the Netherlands. The chemical inactivation of carnation mosaic, reported by Rumley and Thomas [see *H.A.*, 21: 2844], could not be confirmed. Dutch experiments have shown that raspberries suffering from *Rubus*-stunt virus can be cured by heat treatment. Some other possibilities of curing virus diseases are discussed. [See also *H.A.*, 23: 410.]

1637. NICHOLS, C. W., AND NYLAND, G.

Hot water treatments of some stone fruit viruses.

Abstr. in *Phytopathology*, 1952, 42: 517.

Virus infected cherry and peach budwood was treated at various times and temperatures in a hot water bath. After treatment, the buds were placed on mahaleb or Lovell seedlings in the nursery row. The necrotic rusty mottle virus was not inactivated in budwood from an infected mazzard seedling when treated at temperatures and times ranging from 38° C. for 8 hrs. to 50° C. for 25 mins. Peach budwood was treated at 48° C. for 5 and 10 mins, 50° C. for 5 and 10 mins, and 52° C. for 5 mins. Inactivation of the yellow leaf roll virus varied from 4% in the untreated checks to 56% in the buds treated at 50° C. for 10 mins. The yellow bud mosaic and Muir peach dwarf viruses were not inactivated in any of the treatments. Although 60-90% of treated and untreated willow twig-infected buds "took", only 7 to 30% of the buds grew in each treatment and no buds grew in the untreated checks. As yet, no symptoms

have occurred on the growth from the treated willow twig-infected buds.

1638. BLODGETT, E. C., AND OTHERS.

**Index tests for virus in myrobalan plum.**  
From abstr. in *Phytopathology*, 1952, 42: 512.

Buds from 161 myrobalan plum (*Prunus cerasifera*) seed trees, representing 6 sources in Washington and 1 in California, were indexed on Shiro-fugen flowering cherry. 71.4% gave negative, 16.8% mild, 1.2% moderate, and 10.6% severe, reactions. 52.9% of the Californian source but only 17.3% of the Washington sources gave a positive reaction.

1639. COCHRAN, L. C.

**Virus invasion of tops of certain naturally immune stone fruits when grown on infected rootstocks.**

From abstr. in *Phytopathology*, 1952, 42: 512.

Various observations are recorded in relation to grafting known virus-infected and symptomless carrier varieties of *Prunus* spp. Certain symptomless varieties of plum may be immune, but virus sometimes moves into the plum tops from susceptible rootstocks. When ring spot virus was introduced into immune Burbank plums growing on myrobalan rootstock, the virus survived sufficiently to move down into the susceptible rootstock. It appears necessary to grow test plants on their own roots or on immune rootstocks in order to determine susceptibility or immunity.

1640. COCHRAN, L. C.

**Interference between forms of the ring spot virus in peach trees.**

From abstr. in *Phytopathology*, 1952, 42: 512.

The results described indicate that ring spot virus forms afford varying protection against each other. Forms which cause stem necrosis following inoculation into rapidly growing peach nursery trees in August are most likely to give the strongest protection.

1641. KRISTENSEN, H. R.

**Kirsebaer=ringpletsyge, en ny virus=sygdom i Danmark. (Cherry ring spot, a new virus disease in Denmark.)**

*Erhvervsfrugtavl.*, 1952, 19: 60-1, illus.

The article records the presence of ring spot virus in sweet cherries for the first time in Denmark. So far, the disease has been discovered only in one orchard in which 17 trees of two varieties were affected.

1642. MILLIKAN, D. F., AND HIBBARD, A. D.

**Influence of virus upon the growth of one year old sour cherry nursery trees.**

From abstr. in *Phytopathology*, 1952, 42: 470.

In 1950 three different combinations of Montmorency cherry on Mahaleb rootstock were compared, i.e. nursery run on nursery run, ring spot free on nursery run, and ring spot free on ring spot free. Bud take averaged 43.7, 51.5 and 61% respectively, while the average terminal growth was 40.6, 41.9 and 50.9 in. In 1951, Montmorency trees propagated from buds selected at random from nursery run sources were compared with those propagated from the certified

scion block. Bud take averaged 65.6% for the nursery run trees and 67% for the certified trees. Terminal growth for the nursery run trees averaged 42.6 in. and for the certified trees 50.2 in.

1643. SLACK, D. A.

**Dodder transmission of a virus from X-diseased peach and sand cherry.**

From abstr. in *Phytopathology*, 1952, 42: 475.

In greenhouse experiments, using *Cuscuta subinclusa*, a virus was transmitted from X-diseased peaches and sand cherries to herbaceous plants, including strawberry (*Fragaria vesca*, East Malling clone). Leaves of diseased strawberry-plants became markedly rugose and stunted; chlorotic and necrotic streaks occurred on distorted leaves. Diseased plants of all species developed numerous secondary shoots.

1644. WADLEY, B. N.

**Year-to-year variation in symptom expression of western X-disease on peaches in Utah.**

From abstr. in *Phytopathology*, 1952, 42: 519.

From observations in Utah it is concluded that western X-disease symptoms on peaches are much milder in certain years than in others. Relatively high temperatures during the growing season appear to be necessary for the development of severe symptoms.

1645. WADLEY, B. N.

**Symptoms in sweet cherry produced by western X-disease virus from peach.**

From abstr. in *Phytopathology*, 1952, 42: 519.

Western X-disease virus from peach trees produced rosetting, stunting of leaves and enlargement of stipules on seedling mazzard cherry trees. In budding and grafting experiments, some inoculated cherries developed the typical symptoms and others died, presumably from the effects of the virus.

1646. JONES, L. E., AND MILBRATH, J. A.

**The influence of western X little cherry virus upon seed size and viability.**

From abstr. in *Phytopathology*, 1952, 42: 515.

In studies of the morphological variation associated with the presence of western X little cherry virus in Bing, Royal Ann, Lambert and Montmorency cherries, the average weight per air-dried seed from fruit of healthy trees of all varieties was 0.047 g. As the severity of virus symptoms in the fruit increased, the average weight of the seed decreased. The average weight per air-dried seed was (1) from fruit which appeared normal but was infected 0.047 g., (2) from intermediate fruit 0.030 g., and (3) from severe little cherry fruit 0.018 g. The germination average was from healthy trees 14.5%; from diseased trees (1) "normal" 15.9%, (2) intermediate 1.6%, and (3) severe little cherry nil.

1647. WELSH, M. F.

**Studies of the masking of little cherry disease symptoms.**

From abstr. in *Phytopathology*, 1952, 42: 477-8.

In Kootenay cherry plantings, considered to be 100% infected with the little cherry disease, 3 Lambert trees



showed no detectable symptoms. Two of these were found by inoculation and bud transfers to be symptomless carriers and the third was free from disease. Buds from the two symptomless carriers, when applied to diseased Lambert trees, produced growth which bore fruit with typical little cherry symptoms. Two other sweet cherry varieties, demonstrated to be carriers of little cherry virus, have produced normal fruits when applied to diseased Lambert trees in the same manner.

1648. KUENEN, D. J.

Nieuwe wegen in de bestrijding van rondknop op zwarte bes. (New ways of controlling big bud in black currants.) [English summary  $\frac{1}{2}$  p.]

Meded. Dir. Tuinb., 1952, 15: 722-6, illus.

The increase of big bud mites (*Eriophyes ribis*), vector of reversion virus, is logarithmical until development of the population ceases in autumn, probably as a result of low temperatures. Clean propagating material can be ensured by immersing the cuttings in water at 45° C. for 10 minutes, 43° C. for 16 minutes or 41.5° C. for 30-35 minutes. Three applications of colloidal sulphur or 5 applications of lime-sulphur reduced the number of infested buds to 2%, compared with 55% for the controls.

1649. CADMAN, C. H.

Studies in *Rubus* virus diseases. IV. Yellows diseases of raspberries. V. Experiments in the analysis of Lloyd George decline.

Ann. appl. Biol., 1952, 39: 495-500, bibl. 6, and 501-8, bibl. 10, illus.

(1) Yellows diseases of raspberry, previously considered to be physiological disorders, have causes, presumably viruses, that are transmitted by grafting. Several can be distinguished by the severity of symptoms produced in different raspberry varieties, but whether they are caused by distinct viruses or by related strains is uncertain. Two, called mild and severe yellows, are thought not to be related to the yellows mosaic and yellows virus described in North America.

(2) Degenerate Lloyd George plants are usually infected with a complex of viruses comprising mild yellows and at least 2 other viruses, one of which, raspberry leaf-spot virus, is transmitted by the aphid, *Amphorophora rubi*. This virus produces characteristic symptoms on some varieties and is carried without symptoms by others. Both mild yellows and leaf-spot viruses seem to be only subsidiary causes of raspberry degeneration. [From author's summary.]

1650. HUBER, G. A., AND JOHNSON, F.

Black raspberry mosaic in western Washington.

Plant Dis. Repr., 1952, 36: 239-40, illus.

It was found that mosaic in black raspberries is caused by a virus or complex of viruses different from that causing the common green mosaic in the red varieties, and experiments showed that the chronic symptoms of "flecking" (mild mosaic) of red raspberries were really expressions of the black raspberry mosaic virus. In black raspberry varieties the disease shows two types of symptom, cane-tip dieback and leaf mottling, which are described. The symptoms in the field become masked during the high temperatures of summer, and the disease has no apparent detrimental effect on the plants. The large green aphid, *Amphorophora rubi*, is the natural

vector of the virus in the field.—Western Washington Experimental Station, Puyallup.

1651. HUNTER, A. W. S.

Strawberry viruses and the plant breeder.

Rep. Proc. 8th annu. Mtg west. Canad. Soc.

Hort., 1952, pp. 12-15.

The spread of strawberry viruses in Canada is briefly outlined and difficulties of recognizing some of the symptoms, especially on tolerant varieties, are discussed. No information on the aphid vectors in eastern Canada is available, in fact they are rarely seen on strawberries, hence their control is not practicable. It is suggested that keeping breeding material at least  $\frac{1}{2}$  mile from other strawberries and the retention of young seedlings in screened frames before transplanting will give a high degree of protection from virus in the field.

1652. MILLER, P. W.

Preliminary tests of wild strawberries from eastern Oregon for the presence of virus infection.

Plant Dis. Repr., 1952, 36: 352, bibl. 1.

For these investigations, *Fragaria ovalis* and *F. vesca* plants from different clones were collected from 6 widely separated locations in eastern Oregon. None of the collections was made near cultivated strawberry plantings, the nearest strawberry field being over 100 miles away. To ascertain whether viruses were present in the plants they were stolon-grafted to healthy virus-sensitive *F. vesca* (East Malling strain) indicator plants. Of 53 plants tested, only 1 (*F. ovalis*) proved to be infected. This result is discussed in relation to the establishment of certified and foundation stock strawberry plant industries.

1653. MARCUS, C. P., Jr.

Survey for virus-infected wild strawberry plants in eastern United States.

Plant Dis. Repr., 1952, 36: 353-4, bibl. 1.

Wild plants obtained from several strawberry plant producing areas in the eastern half of the United States were tested. The results of the indexing showed that 21 out of 94 or 22% of the lots of wild plants were virus infected. This survey indicates that virus-infected wild strawberry plants are a source of infection for virus-free commercial strawberry plantings, and that precautions, such as isolation of commercial plantings or elimination of wild plants, should be taken.—U.S. Dep. Agric., Beltsville, Md.

1654. MELLOR, F. C., AND FITZPATRICK, R. E.

Strawberry virus complexes.

From abstr. in *Phytopathology*, 1952, 42: 516.

The presence of a latent virus in what appeared to be healthy British Sovereign and Marshall strawberry plants was demonstrated when these varieties were indexed with *Fragaria vesca*. Its properties are the same as those of the non-persistent virus strains associated with Marshall yellows (xanthosis), and it is concluded that the two are identical. When Royal Sovereign strawberry plants were inoculated with these viruses alone, no definite symptoms developed, but when the persistent component virus of Marshall yellows was included, the plants developed typical yellow-edge. A comparison with strawberry viruses in England is drawn.

## 1655. PRENTICE, I. W.

## Resolution of strawberry virus complexes.

## V. Experiments with viruses 4 and 5.

*Ann. appl. Biol.*, 1952, 39: 487-94, bibl. 11.

Strawberry virus 4 produced vein chlorosis and necrosis on strawberry (var. Royal Sovereign) and slight chlorotic spotting on wild strawberry (*Fragaria vesca* L.). No vector is known. Virus 5 produces leaf curling and vein necrosis on Royal Sovereign and *F. vesca*. It is transmitted by strawberry aphids (*Pentatrichopus fragaefolii* Cock.) which have fed on an infected plant for 1 hr or more, and persists for about 1 hr in the vector. The names strawberry mottle, mild yellow-edge, crinkle, vein chlorosis and leaf-curl virus are proposed for strawberry viruses 1, 2, 3, 4 and 5 respectively. [Author's summary.]

## 1656. MAILLET, P.

## Sur la possibilité de transmission de virus par le phylloxéra de la vigne. (The possible transmission of virus by phylloxera.)

*C.R. Acad. Sci.*, 1952, 235: 907, from abstr. in *Progr. agric. vitic.*, 1953, 139: 37-8.

In a pot experiment with 2-year-old vines at Eyzies Biological Station there was a very significant correlation between the presence of phylloxera and of virus.

## 1657. FOGLIANI, G.

## Segnalazione di una malattia della vite riferibile a degenerazione infettiva (arricciamento, roncet, ecc.) a San Colombano al Lambro (Milano). (A grape-vine disease attributed to infectious degeneration (leaf curl, roncet, etc.) at San Colombano al Lambro, Milan.)

*Not. Mal. Piante*, 1952, No. 20, pp. 32-5.

The disease described was observed in vineyards where the plants were mostly on Rupestris du Lot rootstocks. The symptoms were shortened internodes and leaves reddish or yellowish and more pointed than normal. Flowers were few or, on seriously affected plants, failed to develop; when present they aborted and fell early.

## 1658. HEWITT, W. B.

## Transmission of the factor causing "white Emperor" through different grape stocks.

From abstr. in *Phytopathology*, 1952, 42: 514.

Fruit on vines with white Emperor fail to develop the red colour characteristic of the Emperor variety; leaves appear thick and roll down at the margins. Grafting experiments showed that the factor causing white Emperor was transmitted through the wood of the rootstocks known as 1202, 1613, St. George and Salt Creek.

*Bacteria.*

## 1659. THOMAS, W. D., JR., AND HENDERSON, W. J.

## Spray experiments for the control of fire blight on apples and pears, 1947-1950.

*Plant Dis. Repr.*, 1952, 36: 273-5.

Spraying trials during 1947-1950 for the control of *Erwinia amylovora* in Colorado have yielded promising results. It was found that applications of Dithane Z-78 (2 lb. per 100 gal. water) in the 10% bloom stage with a subsequent application in the full bloom stage reduced

the incidence of current season blossom and twig infection approximately 75%. This spray method, together with sanitary pruning and treatment of hold-over cankers, has become a standard recommendation for fire-blight control in Colorado. In areas where the blossoming is longer than that of these trials an additional application should be made about the 90% petal-fall stage.

## 1660. YOUNG, R. A.

## Incipient crown gall infections in mazzard cherry seedlings.

From abstr. in *Phytopathology*, 1952, 42: 520.

Failure to reduce the incidence of crown gall in mazzard cherry seedlings used for rootstocks by treatment with various chemicals was attributed to the presence of incipient infections, and this was confirmed by root pruning and planting seedlings in sterilized soil.

*Fungi.*

(See also 1517, 1518, 1607, 1754 I, s.)

## 1661. MARSH, R. W.

Field observations on the spread of *Armillaria mellea* in apple orchards and in a blackcurrant plantation.

*Trans. Brit. mycol. Soc.*, 1952, 35: 201-7, bibl. 4, illus.

The part of this paper relating to the spread of *armillaria* in apple orchards has also appeared in *A.R. Long Ashton agric. hort. Res. Stat. for 1951* [see *H.A.*, 22: 3592]. Records of infection in a black currant field made from 1932 to 1941 suggest that the major factor influencing the pattern of spread was root contact.

## 1662. HARDER, A.

## Sind die Bienen an der Übertragung und Verbreitung der Fruchtmönillia beteiligt?

(Do bees transmit and spread brown rot?) *Schweiz. Z. Obst- u. Weinb.*, 1952, 61: 541-3, illus.

In experiments at Wädenswil bees were shown to transmit brown rot from infected to healthy pears and zwetschen, provided the fruits were punctured. The orchard wasps are thought to be a more important factor in the spread of brown rot in view of their preference for rotten fruit and of their capacity to injure healthy fruit with their jaws. Bees, however, may be instrumental in spreading *Sclerotinia* flower blight of quince in the course of pollination.

## 1663. CROWDY, S. H.

## Observations on apple canker. IV. The infection of leaf scars.

*Ann. appl. Biol.*, 1952, 39: 569-80, bibl. 11, illus.

Field observations on leaf-scar canker of apple confirm its importance in the south-west of England: on a heavily infected tree more than 50% of the current year's growth may be damaged. Leaf scars may become infected by spores of *Nectria galligena* which are sucked into the tracheids of a freshly exposed scar where they develop in a relatively protected environment. These freshly exposed scars become much less susceptible to infection after approximately one hour. Infections established in leaf scars may develop immediately into



cankers or they may be confined by a suberized or gum barrier. Mycelium from some of these confined lesions may spread into the surrounding healthy tissue through growth cracks when the buds develop. The lesions extend throughout the winter and spring; usually the scars earliest inoculated are the first to show cankers. It seems possible that infections of this type might be controlled by eradicant sprays applied just before leaf-fall. [Author's summary.]—Long Ashton Res. Stat. [See also *H.A.*, 20: 1471.]

1664. BYRDE, R. J. W., CROWDY, S. H., AND ROACH, F. A.

Observations on apple canker. V. Eradicant spraying and canker control.

*Ann. appl. Biol.*, 1952, 39: 581-7, bibl. 9.

Sodium pentachlorophenate and phenyl mercury chloride have been tested as eradicant sprays against apple canker. Trials with inoculated shoots showed that neither of these sprays would affect an established leaf-scar canker. Both chemicals checked sporulation of *Nectria galligena* on cankers but phenyl mercury chloride was the more effective and reduced sporing up to 18 months after application. The incidence of leaf-scar infection was diminished by treatments reducing sporulation, such as spraying with phenyl mercury chloride or the removal of diseased material from the tree. Bordeaux mixture used as a protectant winter spray was ineffective in reducing leaf-scar infection. [Authors' summary.]—Long Ashton Res. Stat., and N.A.A.S.

1665. LEYENDECKER, P. J., Jr.

*Cytospora canker of apple in New Mexico.*

*Plant Dis. Repr.*, 1952, 36: 276-7, bibl. 3, illus.

A fungus, indistinguishable from *Cytospora leucostoma*, has recently been found causing severe damage in apple orchards in San Juan County, New Mexico, particularly on the variety Rome Beauty. In one four-year-old orchard of this variety the disease killed 85% of the trees and injured the rest. In some orchards active cankers were removed by cutting away the infected bark and painting the wounds with a bordeaux paste. In others the cankers were checked by spraying the infected areas with a 4-4-50 bordeaux mixture at very high pressure.

1666. TURNBULL, J.

The control of apple scab in difficult conditions.

*Fruitgrower*, 1952, No. 2968, pp. 891-2.

The Cranbrook fruit spraying competition, which has now run for 6 years, has shown that scab can be controlled under most difficult conditions by spraying more frequently (at intervals of not more than 7-10 days) with smaller quantities. In the most successful schedules 6-9 sprays were given during April-July, the lime-sulphur being used at 3% for the first spray followed by 2% once or twice, 1-1½% at pink bud stage and 1% during and after blossoming. With hand spraying, which gave more variable results than mechanical methods, the greatest success was achieved when heavy applications were used (300-600 gal. per acre per application in the case of the winner). Two of the autoblast users gave 9 sprays for large Bramleys at 180 or 250 gal. per acre per spraying before and during

blossoming, and 250 afterwards, totalling 1,900-2,250 gal. per acre respectively; and 6-7 sprays for other varieties. No advantages were found in particular methods of spraying or in combinations of materials or strengths above recommendations.

1667. ZOBRIST, L., AND FRÖHLICH, H.

Le problème de la lutte contre la tavelure. (The control of scab.)

*Parasitica*, 1952, 8: 112-26, bibl. 6, illus.

An account is given of trials for the control of apple scab, *Endostygme (Venturia) inaequalis*, in Switzerland with particular reference to early infection by ascospores. It is stated that infection can be practically eliminated by two pre-blossom and four or five post-blossom applications of micronized sulphur combined with copper carbonate for the earlier applications and with thiocarbamates for the later ones.

1668. LOUW, A. J.

Spraying experiments against apple scab (*Venturia inaequalis* (Cke.) Wint.) in the winter-rainfall area of the Cape Province. *Sci. Bull. Dep. Agric. S. Afr.* 315, 1951-2, pp. 32, bibl. extensive, illus.

Trials, which took place at Ceres and Elgin in 1942-45, were laid out on a randomized block system using single trees as units, and each treatment was replicated 10 times. Ten brands of spray were used and the test variety was White Winter Pearmain, the most susceptible to scab of all commercial varieties grown in the winter-rainfall area. Full details of the experiments are given. Conclusions were that (1) early ploughing-in of old leaves is a valuable adjunct to spraying; (2) 4 spray applications would effectively control scab in most years; (3) Cu sprays should not be used in this area because of their russetting effect on the fruit; (4) the elemental sulphur fungicides are not suitable as pre-blossom sprays because of their lack of adhesiveness; (5) lime-sulphur at 1 in 100 gives satisfactory control and causes minimal damage during the pre-blossom period; and (6) a programme consisting of lime-sulphur sprays during the pre-blossom period and elemental sulphur sprays during the post-blossom period would effectively control scab with minimal spray injury.

1669. SÖRGE, P.

Über die Wirksamkeit verschiedener Bekämpfungsmittel gegen Apfelschorf zur Nachblütespritzung in Unterfranken. (On the efficacy of several fungicides as post-blossom sprays for the control of apple scab in Lower Franconia.)

Reprinted from *Pflanzenschutz*, 1952, No. 3, pp. 5, illus.

Two years' results of trials carried out at the Staatliche Obst- und Gartenbaustelle, Unterfranken, with different strengths of 9 fungicides.

1670. BURRELL, A. B.

Cumulative effects of lime sulfur and Ferrox flotation sulfur on McIntosh apple trees.

From abstr. in *Phytopathology*, 1952, 42: 463-4.

Lime-sulphur and Ferrox flotation sulphur were applied to 14 single-tree replicates per treatment on a protectant schedule for 10 years in a cool climate. The two forms of sulphur were applied alone or one following the

other. There was an average of 6.6 applications per year. Slightly better scab control resulted from lime-sulphur applied all the season or lime-sulphur followed by flotation sulphur. Yields were lowest with lime-sulphur applied all the season, doubtfully better with lime-sulphur in late season, decidedly better with lime-sulphur early followed by flotation sulphur, and best with flotation sulphur throughout.

1671. WENZL, H.

Beitrag zur Normung von Schwefelpräparaten auf Grund von Schorfversuchen. (The standardization of sulphur fungicides on the basis of scab control.) [English summary 14 lines.]

*PflSch. Ber. Wien*, 1952, 9: 65-79, bibl. 6, illus.

Field tests with various sulphur compounds showed that fungicidal action against apple scab is closely related to particle size of the product. Given an equal content of sulphur, colloidal sulphur sprays (particle size less than  $1\mu$ ) proved more effective than the typical wettable sulphur preparations with a bigger particle size. Sulphur liberated from the polysulphide of lime-sulphur was superior to any wettable sulphur and probably as good as colloidal sulphur. It is further noted that the lowest effective concentrations of colloidal sulphur and of sulphur suspensions are the same for the control of apple scab and powdery mildew of vine.

1672. MOORE, M. H., AND BENNETT, M.

Scab, canker, and branch blister of apple at East Malling in relation to nutritional treatment of the host.

*Ann. appl. Biol.*, 1952, 39: 588-98, bibl. extensive

On the sandy loam at East Malling, moderate annual dressings of inorganic sources of nitrogen and potash exerted no consistent influence on the incidence of apple scab, even when the dressings were continued over an 11-year period on established trees of four different varieties on M.IX rootstock. Likewise, no influence of such dressings continued over five seasons was shown on the incidence of apple canker on the rootstock M.VIII, which was grown under conditions favourable for severe infection. There was evidence from early observations that grassing-down to excess can reduce the incidence of scab, but only at the expense of nitrogen starvation in the trees. Short-term mixed leys had no such effect. The incidence of branch blister, a functional disease associated with adverse soil conditions and retarded vigour, was greatly reduced in the variety Cox's Orange Pippin by potash manuring, and was further influenced by the rootstock. [Authors' summary.]

1673. EGLITIS, M., JOHNSON, F., AND CROWLEY, D. C.

Strains of *Botrytis* pathogenic to blueberries.

From abstr. in *Phytopathology*, 1952, 42: 513.

*Botrytis* isolates from *Rhododendron* sp., laurel (*Prunus laurocerasus*), raspberry, strawberry and *Jasminum* sp. were all pathogenic to blueberries.

1674. YARWOOD, C. E., AND HARVEY, H. T.  
Reduction of cherry decay by washing.

*Plant Dis. Repr.*, 1952, 36: 389.

The percentage of rotting in picked cherries was markedly reduced by washing the fruit with tap water or with tap water+0.1% Triton B1956 (phthalic glyceryl alkylid resin) used as a detergent. The principal fungi present were species of *Botrytis*, *Monilinia* and *Penicillium*.—Univ. Calif.

1675. RICHTER, —.

Stärkeres Auftreten einer Blattfleckenkrankheit an Kirschen verursacht durch den Pilz *Coccomyces hiemalis* Higg. (Heavy incidence of cherry leaf spot disease caused by the fungus *Coccomyces hiemalis*.)

*PflSchutz*, 1952, 4 (1): 7, illus., from abstr. in *Rev. appl. Mycol.*, 1952, 31: 499.

The exceptional prevalence of *Coccomyces hiemalis* on cherries in Germany in 1951 is attributed to the high atmospheric humidity in June and July. The disease was responsible for appreciable damage in nurseries, where the shoots of affected trees failed to attain their normal annual increment. Infection started on sour cherries and subsequently spread to sweet varieties.

1676. GRAVES, A. H.

A method of controlling the chestnut blight on partially resistant species and hybrids of *Castanea*.

*Proc. 41st annu. Mtg north. Nut Grs' Ass.*, 1950, Pleasant Valley, N.Y., pp. 149-51, illus. [received 1953].

Whenever chestnut trees are attacked by the blight fungus [*Endothia parasitica*], suckers arise below the lesion. The diseased bark is then cut out, the wound is painted, and one or more of these suckers is inarched into the healthy bark above the lesion. The sucker, which must be long enough to reach the healthy bark, is sharpened to a long wedge shape and is then inserted into an inverted T cut made on the stem. The grafted parts are tied together and melted paraffin is applied to the union. The best time to perform the operation in Connecticut is April or early May. The method described is not recommended for blight control on very susceptible species such as the American chestnut.

1677. ENGLISH, H.

Phomopsis canker of figs.

From abstr. in *Phytopathology*, 1952, 42: 513.

In recent years fig canker (*Phomopsis cinerescens*) has been very destructive in parts of California. It occurs on all important varieties but is most serious on the Kadota variety which is pruned very heavily, thus leaving large wounds which are open to infection. Tests have shown that the fungus can produce rapidly enlarging cankers throughout the dormant season, but that it can cause only slight, if any, infection during the period of active tree growth, and evidence suggests that pruning Kadota trees as they are emerging from dormancy, rather than during the winter, may provide an effective means of reducing the severity of this disease.

1678. HORN, N. L.

Diplodina on peach in Louisiana.

*Plant Dis. Repr.*, 1952, 36: 351, illus.



A rot of peaches found in a number of orchards in Louisiana is caused by a fungus tentatively identified as *Diplodina* sp. The symptoms on the fruit are very similar to those caused by the brown rot fungus *Sclerotinia* [*fruticola*]*—*brown circular spots which rapidly increase in size until the whole fruit is involved. The fruiting bodies, however, are pycnidia. The morphology of the fungus is described. The similarity of the disease to that caused by brown rot suggests that the two may sometimes be confused, and that the *diplodina* rot is probably more widely distributed than at present recorded.

1679. KITAJIMA, H.

**Studies on the dissemination of peach anthracnose. I. II.** [Japanese, with English summaries  $\frac{1}{2}$  p. each.]

*Ann. phytopath. Soc. Japan*, 1949, **13** (3/4), bibl. 7, illus., and 1951, **15** (2), bibl. 9, illus., reprinted as *Mem. Tokai hort. Exp. Stat.* 3, 1951, pp. 8.

In experiments at Tokai Horticultural Experiment Station *Gloeosporium laeticolor* spores died within 2 weeks in R.H.s of 60-100% and survived 30 days in drier conditions. The fungus is normally unable to survive in dead tissue and chiefly overwinters in live twigs. These generally die before March and conidia may develop in April. Primary infection occurs through the fruit between May and August.

1680. FULTON, R. H.

**Verticillium wilt of raspberries.**

*Quart. Bull. Mich. agric. Exp. Stat.*, 1952, **35**: 248-64, bibl. 34, illus., being *Contr. Dep. Bot. Plant Path.* 52-18.

Investigations were conducted on *Verticillium albo-atrum* and its pathogenic relationship to black and red raspberries. Three constant biotypes of the *Verticillium* fungus were isolated, all being pathogenic to raspberry. The symptoms of the disease are fully described. Root studies on diseased red raspberry showed that some of the sucker plants may be free of infection and that the amount of suckering is reduced as a result of the disease. The only practical control measure recommended is to avoid planting raspberries after solanaceous crops.

1681. VAUGHAN, E. K.

**The significance of raspberry yellow rust control.**

From abstr. in *Phytopathology*, 1952, **42**: 477.

The incidence of raspberry yellow rust, *Phragmidium rubi-idaei*, on the foliage of the fruiting canes is markedly reduced by a single application of fungicide at the green tip stage. Lime-sulphur (4 gal./100 gal.), krenite (0.5 gal./100 gal.), ferbam (3 lb./100 gal.) and ziram (3 lb./100 gal.) have given comparable control with no evidence of phytotoxicity. Subsequent application has not resulted in further reduction of the disease. Reducing the number of individual infections apparently is of benefit to the grower only when uncontrolled infections are so heavy as to cause excessive loss of moisture during the harvest season.

1682. JEFFERS, W. F., AND SCOTT, D. H.

**Significance of physiologic races of *Phytophthora fragariae* Hickman in breeding strawberries for resistance to the red stele disease.**

From abstr. in *Phytopathology*, 1952, **42**: 468.

By testing the susceptibility of 14 varieties and selections to 5 isolates of the red stele organism obtained from England, it was shown that at least 4 physiologic races were present. One or more of these is different from the 3 races found in Maryland. It has been found possible to incorporate resistance to several races of the red stele organism into some selections by crossing plants showing resistance to single races.

1683. NELSON, P. E., AND WILHELM, S.

**Strawberry root anatomy with special reference to black root rot.**

From abstr. in *Phytopathology*, 1952, **42**: 517.

The main roots of healthy strawberry plants and their prominent branches are perennial. These roots develop extensive secondary tissues from vascular and cork cambiums. The ultimate root branchlets are generally incapable of producing secondary growth, and appear to be seasonal or at best annual. They possibly die naturally from degeneration of the primary phloem, or from infections by fungi, *Rhizopagus* sp. and mycorrhizal-like types of *Rhizoctonia* being some of the suspected pathogens. Successive crops of seasonal (non-cambial) roots are produced yearly from the perennial root structure. Wood may become heartwood in the third year, as indicated by some plugging of vessels and by loss of ability of ray cells to store starch. A considerable portion of the large adventitious roots of plants affected with black root rot die before entering the second year type of development. The outer root tissues die first while the xylem continues to function for a time. Non-cambial (feeder) root formation from the surviving second year roots generally is poor.

1684. HORN, N. L.

**Strawberry fungicide screening tests.**

*Plant Dis. Repr.*, 1952, **36**: 309-10.

Great loss has been caused in the strawberry growing areas of Louisiana in recent years by fruit-rotting fungi, particularly *Botrytis cinerea*. In a field screening test for the control of botrytis rot, Orthocide 406 proved best. Not only was the amount of fruit rot reduced, but the plants treated with this material seemed more vigorous than the controls.

1685. BLUMER, S., AND KUNDERT, J.

**Die Peronospora der Rebe und ihre Bekämpfung im Jahre 1952. (Downy mildew of vine and its control in 1952.)**

*Schweiz. Z. Obst- u. Weinb.*, 1952, **61**: 526-9, 533-6.

In 1952 downy mildew of vine was light in Switzerland so that the several fungicides applied in comparative trials were not subjected to a severe test. It appears, however, that the American preparation S-R 406 is especially effective against *Plasmopara viticola*, while it does not give any protection against oidium. Other results showed that the customary addition of sulphur to copper sprays considerably reduced downy mildew control.—Wädenswil.

1686. PIERI, G.

Sull'uso del calendario d'incubazione della peronospora della vite nella provincia di Treviso. (On the use of the vine downy mildew incubation calendar in Treviso province.) [English summary 13 lines.]

*Ann. Sper. agrar.*, 1952, 6: 1577-86, bibl. 5.

In 1951 spray treatment of vine downy mildew (1% bordeaux mixture) in the Conegliano district was based on an incubation calendar for the first time. Using Dr. Clementi's table the durations of the various periods of incubation were determined on the basis of the mean temperature for 10-day periods and good control was obtained, damage being negligible despite weather conditions favourable to the fungus. A detailed description of the course of the attack is given.

1687. PANJAN, M., AND LUŠIN, V.

Ispitivanje natrijevog thiosulfata kao sredstva za zamjenu sumpora kod suzbijanja oidiuma. (Sodium-thiosulphate as a substitute for sulphur for controlling vine mildew.) [German summary  $\frac{1}{2}$  p.]

*Zasht. Bilja*, Belgrade, 1952, No. 10, pp. 42-8, bibl. 7.

In trials conducted at the Institute for Plant Protection, Zagreb, sulphur was found more effective and reliable than Na-thiosulphate for powdery mildew (*Uncinula necator*) control. A combined spray programme, using Na-thiosulphate for the first (pre-blossom) treatment and sulphur for the 2 cover sprays, however, gave satisfactory results.

1688. STAEHELIN, M., AND TERRIER, C.

Le problème de l'économie de cuivre dans la lutte contre le mildiou de la vigne. (Saving copper in the control of downy mildew of vine.)

*Landw. Jb. Schweiz*, 1952, 1 (n.s.): 1077-81.

In 1951 the following two compounds were found to be excellent substitutes for copper fungicides: ethylene bis-dithiocarbamate of zinc, applied by itself or with the addition of a small quantity of copper, and trichloromethylthiotetrahydrophthalimide.—Lausanne.

1689. ZUBOV, M. F.

Copper oxychloride. [Russian.]

*Vinodelie i Vinogradarstvo*, 1952, No. 11, pp. 49-51.

Comparative trials conducted from 1948 to 1950 have shown copper oxychloride and bordeaux to be about equally effective against vine mildew. Copper oxychloride, containing 20 to 30% metallic copper, is recommended for use either as a spray at 0.5 or 0.8% concentration or as a dust at 20-30 kg. per ha. The compound was also found to control white rot of grapes [*Coniophyrium diplodiella*]; it can be applied simultaneously with other fungicides or insecticides such as calcium arsenate and DDT.

1690. HARVEY, J. M.

Field applications of fungicide reduce decay in stored grapes.

From abstr. in *Phytopathology*, 1952, 42: 514.

In the experiments described, storage decay of grapes was reduced significantly by applying Orthocide 406 in the field in conjunction with sulphur dioxide fumiga-

tion for control of post-harvest infections by *Botrytis cinerea*.

1691. BOVAY, E.

La conservation de raisins de table au moyen d'anhydride sulfureux. (Sulphur dioxide for table grape storage.)

*Landw. Jb. Schweiz*, 1952, 1 (n.s.): 1083-6, bibl. 4.

The continuation of earlier experiments [see *H.A.*, 21: 1296] in 1950 and 1951 reaffirmed the possibility of successful table grape storage. Storage quality was found to depend not only on variety but also on the balance of sugars and acids in the berry at the time of harvest. The grapes should be kept at 0° C. in air-tight chambers and fumigation with sulphur dioxide should be carried out periodically at the rate of 15 g./m<sup>3</sup>. The grapes could thus be kept 3 months.—Lausanne.

1692. REYNEKE, J., AND PIAGET, J. E. H.

The use of bisulphites in the control of wastage in fresh grapes.

*Fmg S. Afr.*, 1952, 27: 477-9.

In the gas treatment of grapes for the control of mould wastage, dry stalk and general deterioration during storage, the grapes need to absorb approximately 15 p.p.m. SO<sub>2</sub>, concentrations exceeding 20 p.p.m. being injurious and concentrations below 7 p.p.m. being ineffective. The authors deal chiefly with means of regulating the rate at which SO<sub>2</sub> is liberated by different bisulphites and they make the following recommendations to increase effectiveness and uniformity in treatment: (1) Experiments should be conducted with more dilute solutions of which the pH has been adjusted to deliver SO<sub>2</sub> at the desired rate. (2) More work should be done to determine the relation between the total SO<sub>2</sub> content, rate of SO<sub>2</sub> liberation and the duration of SO<sub>2</sub> liberation under varying conditions. (3) The possible use of buffers to maintain a constant pH or rate of SO<sub>2</sub> liberation for longer or shorter periods, according to conditions of transport, should be investigated.—Western Province Fruit Research Station.

1693. BLUMER, S.

Die Bekämpfung des Zwetschenrostes. (The control of zwetschen rust.)

*Schweiz. Z. Obst- u. Weinb.*, 1953, 62: 5-9, bibl. 2, illus.

Observations on rust (*Tranzschelia* [*Puccinia*] *pruni spinosae*) of plums and zwetschen and on varietal susceptibility are recorded. Of the four fungicides tested for the second and third post-blossom sprays only thiocarbamate (0.2% M555) gave complete control. This chemical seems to have a specific action against rust fungi as Zobrist's trials on the same fungus (*Ibid.*, 1952, 61: 169-73) and earlier experiments on antirrhinum rust have shown. The tests are to be continued to find out whether one post-blossom spray would be sufficient and to determine the time of its application.

#### Mites.

(See also 1754b, g, 1842-1844.)

1694. DIERICK, G. F. E. M., AND DALMEYER, W. H. M.

Spintbestrijding in nieuwe banen. (New ways of controlling red spider mite.)

*Fruitteelt*, 1952, 42: 961-4, illus.



The disadvantages of parathion and other new materials for red spider mite control in orchards are discussed, and the work that has been done by the Royal Shell Laboratory, Amsterdam, in developing a new mineral oil acaricide is outlined. Tests have shown that the new material, called "Shell anti-spintolie" (Shell anti-mite oil), gives excellent mite control and can be mixed with pre-blossom sulphur or mercury sprays. Preliminary tests indicate that it can also be mixed with post-blossom anti-scab sprays but more extensive trials are needed to confirm this. The preparation will be on the market in 1953.

1695. HUNT, J. L.

**Summer control of red spider.**

*Fruitgrower*, 1952, No. 2966, pp. 793-4.

The new summer acaricide, PCPBS (parachlorophenyl benzene sulphonate), was used extensively for the first time in 1952, mostly as a 20% wettable powder at 2½ lb. per 100 gal. water (equivalent to ½ lb. active material) or at half that rate. It gave excellent control but caused severe fruit splitting in Worcesters and slight damage of a different character to Grieve and Newton. DPS (diphenylsulphone) was tested in 3 formulations. The most efficient against both summer eggs and mites was the "Supona", a product containing 35% DPS dispersed in an oil-in-water emulsion, followed by the dispersible liquid (which is costly and somewhat phytotoxic in some cases), and then by the wettable powder which is relatively ineffective at comparable rates of application. A recommended control programme is: (1) 3% miscible DNC/petroleum or 4½-5% standard stock emulsion DNC/petroleum in March; (2) 8 oz. per 100 gal. parathion at petal fall; (3) 1 lb. active material (=2½ pints Supona) DPS per 100 gal. in early June and again 2 weeks later. For the June sprays ¼ lb. active material PCPBS per 100 gal. or parathion might be used instead of DPS.

1696. BARGIONI, G., GUIZZARDI, G., AND MACCANTI, M.

Prove di lotta contro il ragno rosso degli alberi da frutto (*Paratetranychus pilosus*). (Experiments on the control of red spider on fruit trees.) [English summary 6 lines.] *Riv. Ortoflorofruttic. ital.*, 1952, 36: 263-71, bibl. 4, illus.

Detailed results are given of trials at Ferrara. *Winter treatment*: 34 different formulations were tested, mainly mineral or tar oil emulsions at various concentrations alone and in mixture with various dinitro compounds at various concentrations. It was found that either a mineral oil emulsion containing 2% of 4,6 dinitro-*o*-sec-butylphenol applied at a concentration of 5% or a tar oil emulsion containing 0.75% of the same dinitro compound and applied at the same rate destroyed almost all the eggs and hence reduced the first generation so greatly that it could easily be eliminated or controlled by normal spring treatment. Other formulations which gave satisfactory results were: (1) mineral oil containing 0.75% Soffocol applied at 5%; (2) 4% white oil; (3) 4% yellow oil; (4) tar oil containing 0.75% 2,4 dinitro-sec-cyclohexylphenol applied at 5%. *Summer treatment*: 0.05% thioglycophosphoric ester (systox) was completely effective for periods of about 2 weeks.

1697. HAHMANN, K., AND PILTZ, H.

Beobachtungen an der Roten Stachelbeermilbe (*Bryobia praetiosa* Koch). (Observations on the gooseberry red spider mite.) *Nachbl. dtsh. PflSchDienst., Braunschweig*, 1952, 4: 182-3, bibl. 17.

In 1951 and 1952 the gooseberry red spider mite attacked apples and pears, especially the latter, in the Hamburg area, and houses were invaded by the pest both in Hamburg and Berlin, presumably from grass hosts in the immediate neighbourhood.

1698. TUNBLAD, B.

Nya bekämpningsförsök mot rött spinn. (New experiments on the control of the fruit tree red spider.)

*Växtskyddsnotiser*, 1952, No. 4, pp. 49-51. Yyyerligare erfarenheter om spinnmedel. (Further observations on acaricides.)

*Ibidem*, 1952, No. 5/6, pp. 82-4.

Thirteen chemicals, including several systemic insecticides, several preparations of Aramite [see *H.A.*, 23: 459] and Ovotran (parachlorophenyl parachlorobenzol-sulphonate, PCPBS) and a thiophosphoric ester, were tested at Nickelby in the summer of 1952. The sprays were applied on 30 June, about a month after flowering. Leaf counts were made on 6 July, 30 July and 25 August. The tabulated data in the second paper show excellent results against the fruit tree red spider for the systemic insecticide Systox, for Aramite and for Ovotran. The action of the various new acaricides is briefly discussed, with reference to observations in other Scandinavian countries.

### Insects.

(See also 1754f, j, m, q.)

1699. CARTER, W.

Injuries to plants caused by insect toxins. II.

*Bot. Rev.*, 1952, 18: 680-721, bibl. 157, being *Tech. Pap. Pineapple Res. Inst. Hawaii* 205.

The author brings his previous review [*Ibidem*, 1938, 5: 273-326; *H.A.*, 9: 1235] of the literature on plant diseases caused by the toxic feeding of insects up to the end of 1950.

1700. GRAHAM, C.

Control of peach insects with dilute and concentrated sprays.

*J. econ. Ent.*, 1952, 45: 738-9, bibl. 1.

In one year's trial in a Maryland orchard 5 applications of standard and 3× concentration sprays were found about equally effective against insects attacking Elberta peaches. Parathion and TM-1 (EPN) alone, and TM-2 (Metacide) and dieldrin with DDT added to the first and third applications gave very good control of curculio, oriental fruit moth and insects causing cat-facing. TM-3 (Systox) was ineffective against the insects and damaged both fruit and foliage.

1701. SIEGLER, E. H.

Insecticides for nut insects.

*Proc. 41st annu. Mtg north. Nut Grs' Ass.*, 1950, Pleasant Valley, N.Y., pp. 100-9, illus. [received 1953].

Notes are given on the control of 7 insects attacking the

nuts, 8 damaging the foliage, and 5 attacking the trunk and branches of various nut trees including walnut, pecan, hickory and chestnut.

1702. SEN GUPTA, P. K.

**Preliminary observations on the efficacy of methyl bromide as a fumigant for apples and against some pests of dried fruits.**

*Indian J. agric. Sci.*, 1951, 21: 67-76, bibl. 9, illus. [received Dec. 1952].

Results of two preliminary trials are reported. (1) Two apple varieties, Kulu and Kandahari, showed no visible injury when subjected to methyl bromide at 3 lb./1,000 cu. ft. for 1 hr at 80°-100° F. (2) One dried fruit pest, *Oryzaephilus surinamensis*, was killed by methyl bromide at 1 lb./1,000 cu. ft. for 1½ hrs or at 1½ lb./1,000 cu. ft. for 1 hr at 80°-90° F. A second dried fruit pest, *Tribolium castaneum*, required 1½ lb./1,000 cu. ft. for 2 hrs. At lower temperatures higher dosages or longer exposures were needed. The apparatus used is described and illustrated.

1703. NEWTON, J. H., AND LIST, G. M.

**Woolly apple aphid in codling moth and mite control spray plots.**

*J. econ. Ent.*, 1952, 45: 643-5, being *Sci. Pap. J. Ser. Colo agric. Exp. Stat.* 383.

Woolly apple aphid, *Eriosoma lanigerum*, clover mite, *Bryobia pratensis*, and two-spotted mite, *Tetranychus bimaculatus*, built up in Colorado orchards sprayed with DDT for codling moth control. In tests of combinations of acaricides with DDT, definite woolly aphid control was shown with DDT plus sulphur and DDT plus parathion, without lowering the efficiency of DDT against codling moth. The DDT plus sulphur spray is now generally used, controlling codling moth, the 2 mites and the green and woolly apple aphids. [From authors' summary.]

1704. LEEFMANS, S.

**De pereringlarve. (The sinuate pear borer.)**  
*Meded. Dir. Tuinb.*, 1953, 16: 53-5, bibl. 2, illus.

The findings of Jancke [see *H.A.*, 23: 475] in western Germany on the biology and control of the sinuate pear borer (*Agrilus sinuatus*) are discussed in relation to observations made by the author in Holland. Under the more variable climatic conditions of Holland the first control spray should be made 10-18 days (according to the weather) after the emergence of the females and not, as recommended by Jancke, at the time of emergence.

1705. TADIĆ, M. D.

**Biologija kruškinog cvetojeda u nekim voćarskim reonima nr Srbije i Makedonije. (The biology of the pear bud weevil in some orchard districts of Serbia and Macedonia.)**  
[English summary p.]  
*Zashit. Bilj.*, Belgrade, 1952, No. 12, pp. 52-69, bibl. 13, illus.

In Zemun [Serbia] during both 1951 and 1952, 90% of the pear bud weevils, *Anthonomus cinctus*, emerged during the first decade of May, indicating that a single well-timed treatment could kill a very large number of the insects. Laboratory trials have shown Pantakan (16.5% DDT) applied at 0.5 to 1% concentration and Fosfermo at 0.25 to 0.5% concentration to be very

promising for the control of adults. The occurrence of the parasite *Pimpla* (= *Epiurus*) *pomorum* is mentioned, but as it was found only on 1.1% of the weevils examined in 1952, it is considered to be of little economic importance.

1706. ROEHRICH, R.

**Sur le régime alimentaire des adultes de *Cantharis obscura* L. téléphore nuisible aux arbres fruitiers dans la région de Vic en Bigorre (Hautes Pyrénées). (The diet of *Cantharis obscura* adults in Vic en Bigorre Hautes Pyrénées.)**  
*Ann. Épiphyt.*, 1952, 3: 329-37, bibl. 25, illus.

In this report on a diet study it is stated that peaches, cherries, pears, apples and quinces all suffer more or less severely according to the stage of flower development when the insects appear. [For control measures, see *H.A.*, 22: 359.]

1707. FÉRON, —.

**Nouveaux résultats d'essais de lutte contre le capnode (*Capnodis tenebrionis* L) par le traitement du sol. (New experimental results on capnodis beetle control by soil treatment.)**  
*C.R. Acad. Agric. Fr.*, 1952, 38: 715-18, bibl. 5.

Several years' trials have shown that capnodis beetle in apricot orchards is successfully controlled by soil treatment with 3-5 l. of a BHC suspension (2 g. active agent per l.) per tree or with 50-100 g. of a BHC dust containing 1%  $\gamma$  isomer. While normally one application just prior to oviposition (15 May) is sufficient, a second treatment after harvest is recommended for the first year.—*Inst. nat. Rech. agron.*

1708. COURTY, C.

**Sur la lutte contre le *Capnodis tenebrionis*. (The control of *Capnodis tenebrionis*.)**  
*C.R. Acad. Agric. Fr.*, 1952, 38\*: 654-6, bibl. 14.

Discusses laboratory experiments on the action of BHC and other insecticides on the capnodis beetle.—*Fac. Sci. Lyon.*

1709. BOBB, M. L.

**The life history and control of the plum curculio in Virginia.**  
*Bull. Va agric. Exp. Stat.* 453, 1952, pp. 30, bibl. 14, illus.

Studies on the life history of the plum curculio in Virginian peach orchards are summarized for the period 1935-51. Of the many insecticides tested parathion and ethyl p-nitrophenyl thionobenzenephosphonate (EPN 300) proved most effective in killing adults and the majority of the young larvae in the fruit; in addition they had the advantage of controlling most of the other important peach pests, parathion being superior to EPN 300 in this respect. In unsprayed orchards the parasites *Anaphoidea conotracheli* and *Triaspis curculionis* were often found to destroy 40-50% of plum curculio eggs and 45-48% of the larvae respectively.

\* Printed as Vol. 39 in error.



1710. WEINMAN, C. J.

Effect of early season sprays against plum curculio on peaches.

*J. econ. Ent.*, 1952, 45: 646-51, bibl. 6.

A comparison of the standard spray schedule (DDT at full bloom followed by chlordane or parathion in the next application) with one in which a material effective against plum curculio (dieldrin, chlordane or parathion) was used in both sprays shows that significantly better curculio control was obtained on moderately or heavily infested plots with the second method. The percentage of cat-faced fruit was significantly lower and that of total crop harvested was higher where a curculio bloom spray was applied. Among the materials tested dieldrin offered the greatest promise as an early season curculio spray. No residues of dieldrin were found at harvest on fruit sprayed with this compound not later than the first cover application.

1711. BECKHAM, C. M., AND DUPREE, M.

Attractants for the green June beetle with notes on seasonal occurrence.

*J. econ. Ent.*, 1952, 45: 736-7, bibl. 3, being *Pap. J. Ser. Ga Exp. Stat.* 224.

The use of bait pails containing a malt bait is suggested as an aid in reducing infestation of the green June beetle, *Cotinus nitida*, on ripe peaches. Bait pails may also be used as a supplementary control measure around lawns and golf courses.

1712. BÖHM, O.

Der "falsche Kohlerdfloh" (*Haltica oleracea* L.) als Schädling an Wein. (*Haltica oleracea* as a vine pest.) [English summary 5 lines.]

*PflSch. Ber. Wien*, 1952, 9: 153-4, bibl. 4.

The foliage of vines was found to be damaged by an insect identified as *Haltica oleracea*. Laboratory and field tests showed that the pest can be controlled by DDT, BHC and parathion at concentrations usual in viticulture. Weeds seem to promote its incidence in vineyards.

1713. SIDOR, K.

The cockchafer in the region of Sremski Karlovci (Voyvodina). [Serbian, English summary ½ p.]

*Zashit. Bilja*, Belgrade, 1952, No. 10, pp. 33-9.

Cockchafers in the region of Sremski Karlovci cause considerable damage to young vines. During 1951 1% DDT applied against the adults, which here appear every third year, gave satisfactory results. Of 3 insecticides, DDT, BHC and parathion, used against the larvae, 20% BHC dust, applied at the rate of 250 kg. per ha, gave the best results.

1714. KLOFT, W.

Über Möglichkeiten zur Bekämpfung des zottigen Blütenkafers *Tropinota hirta* Pod. (On possibilities of controlling the beetle *Tropinota hirta*.)

*NachrBl. dtsh. PflSchDienst.*, Braunschweig, 1953, 5: 11, bibl. 3.

Incidence of the pollen eating beetle *Tropinota hirta*, which caused severe losses to stone fruit crops in certain parts of Germany in 1948 and 1949, was not yet back to normal in 1952. Preliminary trials with the spray

preparation Holfidal (1%; Farbwerke Hoechst), which is not injurious to bees and can therefore be applied at full blossom, gave promising results.—Würzburg Univ.

1715. WITTWER, M., AND MÜLLER, G.

Versuche mit einem neuen Nebelverfahren zur Bekämpfung der Kirschenfliege (*Rhagoletis cerasi* L.). (Trials with a new mist blower for the control of cherry fruit fly.)

*Schweiz. Z. Obst- u. Weinb.*, 1953, 62: 11-15, illus.

Experiments carried out by the J. R. Geigy A.G. showed that one application of DDT by a German-type mist blower on 31 May, 1952, controlled cherry fly up to the beginning of July as effectively as did two applications of DDT by an ordinary motor sprayer. In view of its long residual effect the mist should be applied 5 weeks before the probable date of harvest. Data of the experiments are presented diagrammatically and the mist blower used is illustrated.

1716. GROVES, J. R.

The summer fruit tortricid.

*Gdnrs' Chron.*, 1953, 133: 51.

Results of experiments at East Malling have shown DNC (4% petroleum with 0.1% DNC) as a delayed dormant winter wash and DDT (0.1%) applied at the green cluster stage to be about equally effective for the control of the tortricid [*Adoxophyes orana*]. Against the summer generation, applications of parathion, toxaphene or DDT in June are recommended.

1717. BÖHM, H.

Auftreten von *Carpocapsa dannehl* Obr. in Österreich. (Incidence of *Carpocapsa dannehl* in Austria.)

*PflSch. Ber. Wien*, 1952, 9: 100.

This is the first report of *Carpocapsa dannehl* on pear in Austria. Three varieties, among them Bartlett, have so far been attacked.

1718. ROWBOTHAM, J. C.

A successful method of spraying against looper caterpillars and other springtime pests.

*J. Agric. W. Aust.*, 1952, 1 (n.s.): 637-40, illus.

Looper caterpillars (*Chloroclystis lacticostata*) were controlled successfully on apples at less than one-fifth the usual cost by employing 2 men to apply a 20% DDT spray at about 0.1% concentration from a trailer hitched behind a home-made power sprayer. The tandem unit was driven along alternate inter-rows at 3½-4 m.p.h., the spray being applied at 200 lb. per sq. in. in a rather coarse stream. The time of spraying was late petal fall. The trees had previously received a dormant red oil spray applied in the conventional manner.

1719. BÖHM, H., AND PSCHORN-WALCHER, H.

Biologie und Bekämpfung von *Hyphantria cunea* Drury (Lepidopt., Arctiidae—Weisser Bärenspinner). (Biology and control of *Hyphantria cunea*.) [English summary pp. 1½.]

*PflSch. Ber. Wien*, 1952, 9: 105-50, bibl. 12, illus.

In 1951 the fall webworm made its first appearance in Austria, and in 1952 its biology and ecology were extensively studied. Seventy-three host species have so far been found to be attacked by the pest, among them many fruit trees, vegetables and ornamentals. DDT, BHC, mixtures of these two chemicals and parathion were tested for purposes of control. Parathion was the only insecticide that was completely successful against the larval stages 1-5 and partially successful against stages 6 and 7. In large-scale trials, however, satisfactory control in the field was also achieved by DDT and BHC mixtures. Parasites and predators are recorded.

# 1720. EUROPEAN PLANT PROTECTION ORGANISATION.

*Hyphantria cunea* Drury. 2nd Vienna Conference 7-8 Nov. 1952.

[Publ.] E.P.P.O., Paris, 14 Rue Cardinal Mercier, 1952, pp. 23.

At the Conference reports were given on the 1952 campaigns against the American fall webworm in Yugoslavia and Austria, where the control measures adopted were very successful. A laboratory for the study of the pest by entomologists from any country has been established in Yugoslavia, and the Commonwealth Institute for Biological Control, Ottawa, has been entrusted with the collection of parasites. The pamphlet is in French and English.

# 1721. SMITH, E. H.

Control of peach tree borer and lesser peach tree borer.

*J. econ. Ent.*, 1952, 45: 611-15, bibl. 4, being *J. Pap. N.Y. St. agric. Exp. Stat.* 886.

Commercial control of both peach tree borer, *Sanninoidea exitiosa*, and lesser peach tree borer, *Synanthedon pictipes*, was obtained with 3 sprays of parathion (15% wettable powder) applied at the rate of 2 lb. per acre, or EPN (25% w.p.) at 1.25 lb. per acre. The inclusion of these sprays in the general control programme is considered.

# 1722. SMITH, E. H., AND HARRIS, R. W.

Influence of tree vigor and winter injury on the lesser peach tree borer [*Synanthedon pictipes*].

*J. econ. Ent.*, 1952, 45: 607-10, bibl. 4, being *J. Pap. N.Y. St. agric. Exp. Stat.* 888.

Data are presented showing a positive correlation between tree vigor and borer infestation. It appears that this situation is due to the more favorable conditions for oviposition and subsequent larval establishment afforded by wounds on trees high in vigor. The wounds in which borers became established were largely caused by winter injury. The establishment of borers was related to the presence and condition of injuries, especially as related to the amount of gum secreted. No evidence was found to indicate that borers initiated injury. [Authors' summary.]

# 1723. FUKUDA, J., AND OKUDAI, S.

Studies on the resistance of chestnut varieties to the gall wasp (*Dryocosmus kuriphilus* Yasumatsu). I. [Japanese with English summary  $\frac{1}{2}$  p.]

*Oyo-Dobutsugaku-Zasshi*, 1951, 16, No. 3/4, pp. 10, being *Mem. Tokai hort. Exp. Stat.* 8.

Some varieties are resistant because larvae hatching from eggs laid in the buds die out by February.

# 1724. BERNARD, J.

Essais de lutte contre les hoplocampes du prunier. (Experiments in the control of the plum sawflies.) [English summary 8 lines.] *Bull. Inst. agron. Gembloux*, 1952, 20: 9-22, bibl. 10.

Experiments in the control of *Hoplocampa minuta* and *H. flava* on various plum varieties were conducted by the Belgian National Entomological Station in 1948. Ovicidal treatment was given either at the end of petal fall or when the eggs were hatching. Products used were nicotine and nicotine-oil, BHC, DDT wettable powder and emulsion, derris, rotenone oil and HETP. The first 2 and the last were unsatisfactory. Best results were given by (1) 12.5% crude BHC at 1 kg. per 100 l. water and 6.5% BHC gamma isomer at 0.25 kg. per 100 l. water applied at either stage (97.5-100% success); (2) 20% DDT emulsion at 0.25 l. per 100 l. water applied at either stage (87-100%); and (3) commercial derris at 1 l. per 300 l. water applied at the later stage (96-99% except in one case). Larvicidal treatment was applied when the larvae had begun to enter the fruit, and the products used were the same as in the ovicidal treatment, plus quassia. All were unsatisfactory except DDT and quassia which gave the following results: (1) DDT emulsion 90% success, (2) DDT wettable powder 82-90%, (3) quassia extract 79-98%.

# 1725. BERNARD, J.

Observations sur le vol et la ponte chez *Hoplocampa minuta* Christ. (Hymen. Tenthredinidae). (Observations on the flight and oviposition of *Hoplocampa minuta*.) *Parasitica*, 1952, 8: 159-72, bibl. 9.

Flight and oviposition generally coincide with plum flowering in Belgian orchards.

# 1726. FORTE, P. N.

The control of mealy bug on vines in Western Australia.

*J. Agric. W. Aust.*, 1952, 1 (n.s.): 561-9, bibl. 14, illus.

Mealy bug (*Pseudococcus maritimus*) attacks on vines in Western Australia are described. In control trials 2% DDT emulsion spray applied before bud burst was found to give very good control. General sprays of DDT at  $\frac{1}{2}$ % also reduced infestations and appeared to have little effect on the principal predators of mealy bugs.

# 1727. HILL, C. H.

The biology and control of the scurfy scale on apples in Virginia.

*Tech. Bull. Va agric. Exp. Stat.* 119, 1952, pp. 39, bibl. 26, illus.

Scurfy scale (*Aspidiotus furfurus*) is a serious pest of fruit and a threat to most apple orchards in Virginia. It not only weakens the tree but will kill the lower branches and eventually the tree itself. In addition, the fruit frequently becomes infested. The biology of the insect was studied in northern Virginia during 1947-51. Its most important natural enemy is the mite, *Hemisarcopites malus*, which was found to be predacious on adults and eggs. Paraffinic oils at 3% and a petal fall application of parathion (4 oz./100 gal.) gave equally



good control, both chemicals being superior to a variety of other insecticides tested.

1728. CHABOUSSOU, F.

Le traitement d'hiver contre la cochenille rouge du poirier. (Winter spraying for control of pear red scale.)

Rev. hort. Paris, 1953, 125: 799-800, bibl. 2, illus.

Following an account of the biology of, and serious damage caused by, the red scale of pear (*Epidiaspis leperii*) in the south of France, information is given on recently studied methods of control. Summer spraying is ineffective. Of the winter sprays only mineral oils are suitable, the miscible type giving better control than the soluble. Where the old shells are more than one layer deep it is necessary to add DNC (yellow oil) or diethyl thiophosphate (oleoparathion). For old colonies concentrations of 5% yellow oil or 3% oleoparathion (containing 3% SNP) are recommended. The best control (97-100%) is obtained if an initial spray to wet the scales is followed  $\frac{1}{2}$  hr later by a second.

1729. VASSEUR, R., SCHVESTER, D., AND BIANCHI, H.

Sur l'effet aphicide de certains traitements contre le pou de San José (*Quadraspidiotus perniciosus* Comst.). (On the aphicidal effect of certain treatments against the San José scale (*Quadraspidiotus perniciosus*).)

Ann. Épiphyt., 1952, 3: 339-50, bibl. 8, illus.

Experiments were conducted in 1949-51 to determine the aphicidal effect of 3 treatments which are highly efficacious against San José scale, viz. (1) a dormant spray of 3% white oil; (2) a 2% spray of 75% yellow oil containing 2.5% DNOC at the end of winter; and (3) a 1% spray of white oil containing DDT (0.1% active ingredient) applied at the beginning of spring. It was found that the yellow oil plus DNOC formulation gave good control of *Dentatus* sp. on pear, *Aphis pomi* on apple, and *Hyalopterus arundinis* and *Myzus persicae* on peaches. The white oil plus DDT formulation gave good control of *Anuraphis persicae*. These 2 are both preferable to mineral oil alone, which is unsatisfactory against aphids and their eggs.—San José scale Lab., Saint-Genis-Laval (Rhône).

1730. FAGNANI, G.

Sensibilità delle piante da frutto al trattamento con gas sotto vuoto. (The susceptibility of fruit trees to gas treatment in vacuo.)

Not. Mal. Piante, 1952, No. 21, pp. 32-5.

The susceptibility of 1- and 2-year-old dormant pear, apple and peach trees infected with San José scale (*Aspidiotus perniciosus*) to gas treatment under vacuum was tested in an autoclave. Ten different treatments were given at temperatures ranging from 12° to 18° F. Gas-tox was used at 4 concentrations and durations ranging from 1,500 g. per cu. m. for one hour to 200 g. for 20 hours; methyl bromide was used at 4 concentrations and durations ranging from 100 g. per cu. m. for 2 hours to 20 g. for 20 hours; and 2 groups of plants were autoclaved for 2 and 20 hours respectively without gas or vacuum. Many pears and apples showed gas

lesions and some of the affected branches died or remained cracked and spotted. Lesions due to asphyxiation were observed in the longer treatment without gas. In general, there was some physiological disturbance and plants showed uneven growth of shoots. The peaches, which appeared not to have survived the treatment, subsequently developed well but did not flower. The pears and apples flowered well but set little fruit; the younger ones were the more sensitive to treatment. It was concluded that gas-tox should be applied either at 200 g. per cu. m. for 6 hours or 400 g. for 2 hours, and that for methyl bromide the dose should be 35-60 g. per cu. m. and the duration 2 hours. The scales were destroyed at these concentrations and durations.—Plant Path. Inst., Milan.

### Other pests.

1731. LANGEVELD, D. W.

De woelrat en zijn bestrijding. (The vole and its control [in orchards].)

Fruittelt, 1952, 42: 777-8, illus.

The vole (*Arvicola terrestris*) can cause great destruction in young orchards by eating the roots of the trees. It shows a preference for apples and pears on weak rootstocks, such as M.IX and quince. The damage is usually done in winter when there is a scarcity of other food, but it may not be noticed until spring when the trees fail to develop properly or die. Where the orchards are surrounded by dykes the vole will nest in the banks. Instructions are given for finding the nests, destroying the voles with poison baits (1% thallium sulphate in cooked potato), trapping them in the dykes, and preventing infestations by keeping the swards closely mown and the dykes well cleaned.

### Antibiotics.

(See also 2067p, 2349.)

1732. ANDERSON, H. W., AND GOTTlieb, D.

Plant disease control with antibiotics.

Econ. Bot., 1952, 6: 294-308, bibl. 112.

None of the antibiotics here reviewed shows promise for general use, though each might find limited application. Actidione, the best known of this group of plant protectants, gives very effective control of certain diseases, and perhaps could be produced economically, but it is unlikely that it will become a general fungicide because of its toxicity to many host plants.

1733. CERCOS, A. P.

Microorganismos antibióticos activos sobre fitopatógenos aislados en la Argentina. (Antibiotic micro-organisms isolated in Argentina that are active against phytopathogens.) *Idia*, 1952, 5 (54): 10-15, illus., being (*Publ. Inst. Fitotec.* 141.

The antibiotic activity of certain Actinomycetes and bacteria isolated from the air and the soil was tested on the fungal parasites of some horticultural and field crops. *Streptomyces* D.I.N.R. 199 and *Streptomyces* D.I.N.R. 234, when tested on a number of fungi including *Botrytis cinerea*, *Colletotrichum* sp., *Fusarium* spp., *Penicillium roseum* and *Rhizoctonia solani*, showed specific and in some cases intense activity. The effect of 16 bacteria on *Piricularia oryzae* was tested. A bac-

terium, *Bacillus subtilis* D.I.N.R. 49, produced the antibiotic fungocine which was tested on certain fungi.

1734. BAWDEN, F. C., AND FREEMAN, G. G.  
The nature and behaviour of inhibitors of plant viruses produced by *Trichothecium roseum* Link.

*J. gen. Microbiol.*, 1952, 7: 154-68, bibl. 27.

Culture filtrates of *Trichothecium roseum* (apple pink mould) contain 2 substances, trichothecin and a polysaccharide, that inhibit infection with plant viruses. Tests with these substances are described and their mode of action is discussed.

### *Fungicides and insecticides.*

(See also 1494, 1754o, 1911.)

1735. MARTIN, H., AND MILES, J. R. W.  
Guide to the chemicals used in crop protection.  
[Publ.] Canada Dep. Agric. Sci. Serv., 1952, pp. 236.

The formulae, alternative names, history, methods of manufacture, physical, chemical and biological properties, formulations and analyses are given of about 200 of the chemicals in use for the protection of crops from insects, fungi, weeds and animals. The subject matter is usefully arranged in punched loose sheets so that future revisions and supplements may easily be absorbed.

1736. MARTIN, J. V.  
Pesticides Quarterly Supplement.  
*Pesticides quart. Suppl. Commonw. Aust. Dep. Health*, 1952, No. 3, pp. 177-223, bibl. 79.

A general chapter on rules and regulations, specifications, and residue problems is followed by notes on insecticides, fungicides, herbicides and rodent poisons. The notes refer chiefly to the toxicity of the compounds to man and animals, and among other subjects are properties, formulae and methods of use. There are appendices on American and British terminology.

1737. HENRIET, J.  
Compatibilités et incompatibilités en phyto-pharmacie. (The compatibility and incompatibility of plant protective chemicals.)  
[English summary 4 lines.]  
*Rev. Agric. Brux.*, 1952, 5: 1291-1310, bibl. 6, 1 colour chart.

The distinctive feature of the article is a colour chart showing at a glance the degree of compatibility between the more important fungicides and insecticides used to-day.

1738. AMERICAN PHYTOPATHOLOGICAL SOCIETY, FUNGICIDE COMMITTEE.  
1951 summary of results of fungicide tests in the United States and Canada.  
*Plant Dis. Reprtr*, 1952, Suppl. 213, pp. 109-40.

After a short introduction the results are given of trials in various regions, particularly with reference to the use of synthetic organic preparations, on the following crops: (1) Vegetables (including tobacco), small fruits (raspberry, red and black currant and gooseberry), field

and forage crops, and ornamentals (turf and flowers). (2) Fruit crops, including nuts. Notes are given in many cases on "over-all preference" and "order of disease control".

1739. READ, W. H., AND SMITH, R. J.  
Agricultural fungicides.  
*A.R. Progr. appl. Chem. for 1951, 1952*, 36: 677-84, bibl. 52.

A review of recent literature on soil fungicides, systemic fungicides, viricides and fungicidal action.

1740. TANAKA, S.  
Studies on factors influencing the fungicidal value of bordeaux mixture. [Japanese, English summary 1 p.]  
*Forsch. PflKr.*, Tokyo, 1951, Hft. 4, pp. 145-59, bibl. extensive, being *Mem. Tokai hort. Exp. Stat.* 7.

In these experiments at Tokai Horticultural Experiment Station bordeaux mixture was generally used at a concentration of 0.2% and its fungicidal power was gauged by the % germination *in vitro* of spores of *Alternaria kikuchiana*. Conclusions were that (1) quick lime is the best type of lime followed by slaked lime, with weathered lime much inferior; (2) the greater the quantity of lime the higher the fungicidal power of the bordeaux and the greater its resistance to leaching; (3) when added to bordeaux, Zn sulphate, Mg sulphate, Pb arsenate and Ca arsenate did not reduce (and sometimes increased) its fungicidal power, Fe sulphate and wettable sulphur caused a partial reduction, and Mn sulphate and lubricating oil emulsion caused a great reduction; (4) bordeaux kept for several days after preparation became gradually reduced in fungicidal power, and dry bordeaux on slides became gradually reduced but was still of use after 2 weeks; (5) fungicidal power was highest at temperatures near the optimum for spore germination of the fungus used; (6) fungicidal power increased in proportion to the length of time the spray wetted the spores; (7) carbon dioxide was complicated in its effect but appeared to reduce the efficacy of the bordeaux.

1741. MARTIN, J. T.  
Agricultural insecticides.  
*A.R. Progr. appl. Chem. for 1951, 1952*, 36: 684-92, bibl. 96.

A review of the recent literature on the following, among other subjects: Insecticides from plant sources, DDT, BHC, organo-phosphorus insecticides, systemic insecticides and spray residues. There are many references to horticultural, especially fruit, pests.

1742. COSTA, J. J., MARGHERITIS, A. E., AND LAMDAN, S.  
Contribución al estudio del clordane 1068. Su química y su poder insecticida. (A contribution to the study of chlordane. Its chemistry and insecticidal properties.)  
*Idia*, 1952, 5(56): 2-32, bibl. extensive, illus.

The chemical structure and physical properties of chlordane, the various types of formulation in which it is used, and its chemical analysis are discussed. Brief notes are given on the control of many plant pests.



## 1743. CHANCOGNE, M.

Étude des actions ovicides. III. Influence des mouillants sur la toxicité du dinitrocrésylate de sodium. (A study of the action of ovicides. III. Influence of wetting agents on the toxicity of sodium dinitroresylate.)

*Ann. Épiphyt.*, 1952, 3: 323-8, bibl. 3.

A description is given of an experiment in which the effects were tested of 10 different named wetting agents on the toxicity of Na dinitroresylate to the eggs of *Ephestia kuehniella*. The wetters did not affect its efficacy.—Versailles Plant Chem. Lab.

### Spray apparatus and technique.

## 1744. MÜLLER, O.

Schutzmasken für die Spritzenarbeiten. (Protective masks for applying sprays.)

*Schweiz Z. Obst- u. Weinb.*, 1952, 61: 494-6, illus.

A short account is given of types of masks which are on the market for protecting the faces of persons applying poisonous synthetic insecticides in vineyards and orchards. The Willson-Agrisol-Schutzmaske is specially recommended.

## 1745. HOARE, E. R.

The trend of agricultural engineering.

*A.R. Progr. appl. Chem. for 1951, 1952*, 36: 672-5, bibl. 14.

Discusses some recent developments in machinery for low volume spraying and for the speedy assessment of droplet size and number.

## 1746. COURSEY, R. J.

Fog spraying.

*Comm. Grower*,\* 1953, No. 2976, pp. 64-5, illus.

Fog spraying, like small-volume spraying, uses very light-weight, low priced machines and the minimum of material, but is a more efficient method for obtaining the complete and uniform deposit desirable for pest control. The droplet sizes used in fog spraying range from about 10 to 100 microns with the optimum range still an unknown factor. Of the many methods and machines available for producing and dispersing a fog of insecticide material the Flit gun or air blast nozzle and the glasshouse aerosol bombs are the best known. For large-scale work only the Swingfog thermal aerosol generator and the Microsol sprayer range are now available. Both types were found successful for indoor work, but how great their influence will be on orchard spraying methods remains to be seen.

### Spray damage and residues.

(See also 1754a.)

## 1747. MORETTI, A.

Di alcuni riflessi fisiologici dei trattamenti chimici invernali alla vite. (Some physiological effects of winter spraying on the vine.)

[English summary  $\frac{1}{2}$  p.]

*Riv. Fruttic.*, 1953, 15: 2-25, bibl. 19, illus.

Experiments were conducted at Conegliano in 1949 and 1950 to determine the physiological effect on the vine of winter spraying with certain chemicals. The

\* Formerly *Fruitgrower*.

varieties used were Prosecco Balbi (which begins growth early) and Italian Riesling (which begins growth late). The chemicals were (1) insecticides: 8 and 16% Ca polysulphate at 32° Bé (Ca.P), and 8% winter Volck (W.V.); (2) growth substances: 0.1% Na beta-indoleacetate (I.A.Na), 0.1% Na alpha-naphthaleneacetate (N.N.Na) and 0.1% Na 2,4-dichlorophenoxyacetate (2,4-D.Na); (3) mixtures of insecticide and growth substance: 16% Ca.P plus I.A.Na, and W.V. plus I.A.Na. The sprays were applied on 10-12 March (1) at atmospheric temperature, and (2) previously heated to give a temperature of 70-75° C. for a few seconds when in contact with the bark. Conclusions were: (1) None of the treatments have a growth-retarding action sufficient to confer protection against late frosts; the maximum delay (7-9 days) was caused by 16% Ca.P. plus I.A.Na applied at atmospheric temperature and the next greatest (5-7 days) by I.A.Na alone. (2) The hot and cold Ca.P sprays, the 16% Ca.P plus I.A.Na sprays, and the I.A.Na sprays caused irregularity of shooting and blind buds. (3) Flower drop was increased by 2,4-D.Na. (4) Yield was lower than in the control in the hot treatments (less by 0.5 and 1.5 kg. per vine in the 16% Ca.P treatment and the 16% Ca.P plus N.N.Na treatments respectively). 2,4-D.Na was the only hormone that caused a great reduction in yield (between 1.1 and 3.5 kg. per vine). (5) The effects of the chemicals varied with species, state of the plants and weather.

## 1748. THOMAS, C. A., AND OTHERS.

Effects on plants of parathion applied to foliage for the destruction of greenhouse pests.

*Bull. Pa agric. Exp. Stat.* 559, 1951, pp. 18, illus. [received 1953].

After an introductory note on parathion injury, lists are given of (1) species and varieties that have been treated with and without ill effect, (2) species occasionally or consistently injured by sprays and aerosols, and (3) species susceptible to injury by wettable powder applied as a spray.

## 1749. FAHEY, J. E., HAMILTON, D. W., AND RINGS, R. W.

Longevity of parathion and related insecticides in spray residues.

*J. econ. Ent.*, 1952, 45: 700-3, bibl. 8.

Studies of parathion deposits on apple foliage show that, during periods of uniform temperature and in the absence of rainfall, the rate of loss of parathion from spray deposits is a function of the log of the time elapsed. In a comparison of the longevity of parathion, methyl parathion, Metacide, and EPN in spray deposits on apple foliage, EPN was dissipated less rapidly than parathion, parathion was lost less rapidly than methyl parathion or Metacide during the first 4 days of weathering, but there was no difference in retention after 7 days of weathering. On peach fruits the rate of loss of parathion and EPN was much greater in southern Indiana than in northern Ohio. Although the persistence of EPN was greater than that of parathion, the difference between the two widely separated orchards was greater than between insecticides. [Authors' summary.]—Bur. Ent. and Plant Quar., Beltsville, Md.

1750. LÜDICKE, M.

Über das Verhalten von radioaktivem O,O-Diäthyl-O,p-nitrophenyl-monothio-phosphat auf der Pflanze. (The action of radioactive O,O-diethyl-O,p-nitrophenyl-monothio-phosphate on plants.) [English summary  $\frac{1}{2}$  p.]

Z. PflKrankh., 1952, 59: 451-9, bibl. 9, illus.

Radioactive  $P^{32}$  parathion was applied locally to leaves of privet (*Ligustrum ovalifolium*) and a fern (*Polystichum falcatum*), to twigs of various ages of sour cherry, wild plums and peaches, and to stored apples. It was used at a concentration of 0.05% in distilled water. Its absorption and the translocation of its decomposition products was studied with a Geiger-Mueller counter, and by means of auto-radiographs. On sour cherry shoots a radioactive radiation has been found after the application of  $P^{32}$  parathion in longitudinal strips and a similar diffusion of radioactive material was found in twigs of wild plums. No radioactive radiation could be found below the point of application on two-year-old peach twigs when  $P^{32}$  parathion was applied in bands. When applied in drops on stored apples the radioactive preparation penetrated to a depth of 7 mm. into the fruits, and a lateral diffusion was noticeable up to 6 mm. from the edge of the applied drop.

1751. VASSEUR, R., AND BIANCHI, H.

Observations sur l'emploi des huiles minérales pour les traitements de la vigne. (Observations on the use of mineral oils on vines.)

Ann. Epiphyt., 1952, 3: 315-22.

After the widespread use of tar oil and mineral oils (sometimes fortified with DNOC) against scales in south-eastern France in the winter of 1948-49, scorching of shoots, slow growth and reduction in yield were observed in the Gamay variety, particularly in the case of older vines and those treated with mineral oil. To obtain further information the following treatments were given in an experiment on 30-year-old Gamay vines in the third week of February 1950: (1) 2, 3 and 4% concentrations of 83% winter oil emulsion; (2) the same concentration of 80% mineral oil emulsion of another brand; (3) the same concentrations of a yellow oil emulsion containing 75% oil plus 2.5% DNOC; (4) 3, 4 and 5% concentrations of Antilichen emulsion containing 33.5% mineral oil and 33.5% tar oil; (5) 6 and 8% concentrations of 60% tar oil. It was concluded that mineral oils should not be used alone on Gamay; that the best formulation appeared to be a mixture of mineral and tar oils, but the concentration of the mineral oil should not exceed 1.5%; and that tar oils can be used alone provided the concentration does not exceed 3.6% (equivalent to 5-6% in most commercial products).—San José Scale Lab., Saint-Genis-Laval.

1752. JOHNSEN, P.

Pestox III and bees.

Bee World, 1953, 34: 8-9, bibl. 1.

Although no evidence of contact effect has been recorded, a preliminary investigation in Denmark shows that Pestox III must be considered very toxic to bees as a stomach poison by comparison with other sprays. Experiments with 2 species of Liliaceae showed that the insecticide could poison the nectar of sprayed plants.

1753. DUROCHER, J., AND LAGNEAU, C.

Sur les inconvénients que peuvent présenter en conserverie les résidus de certains produits anticryptogamiques ayant été utilisés pour le traitement des fruits. (On the ill effects on canned fruit of the residues of certain fungicides.)

C.R. Acad. Agric. Fr., 1952, 38: 731-5.

An examination of apricot tins showing internal sulphuration and corrosion led to the discovery of the presence of sulphuretted hydrogen, and to the conclusion that the cause was the residue of wettable sulphur fungicides. To confirm this, tests were conducted with 4 such fungicides. In each case the tins showed sulphuration and sulphuretted hydrogen was present. Since such fungicides could thus cause heavy losses of canned fruit it appears that the season of their use should be strictly controlled or that they should not be employed at all.

### Noted.

1754.

a BARTLET, J. C., WOOD, M., AND CHAPMAN, R. A.

Determination of arsenic in fruits and vegetables.

Analyt. Chem., 1952, 24: 1821-4, bibl. 17.

b BECKER, H.

Über den Einfluss konstanter Temperaturen, relativer Feuchtigkeit und Licht auf die Frühjahrsentwicklung der Wintereier der Obstbaumspinnmilbe *Paratetranychus pilosus* Can. et Franz. (On the influence of constant temperatures, relative moisture and light on the development in spring of the winter eggs of the fruit tree red spider.)

Anz. Schädlingskunde, 1952, 25: 116-18, from abstr. in PflSch. Ber. Wien, 1952, 9: 159-60.

c BESS, H. A., SHERMAN, M., AND MITCHELL, W. C.

Plant, poultry and livestock pests and their control.

Ext. Bull. Hawaii agric. Ext. Serv. 57, 1952, pp. 46.

d CHANASYK, V.

Theoretical studies in hardiness research.

Rep. Proc. 8th annu. Mtg west. Canad. Soc. Hort., 1952, pp. 37-40, bibl. 9.

A review of literature.

e FULTON, J. P.

A tobacco necrosis virus associated with strawberry plants.

Plant Dis. Repr., 1952, 36: 313-14, bibl. 8.

f GAMBARO, P.

Il comportamento di *Carpocapsa pomonella* L. in rapporto all'alimento. (The life cycle of *Cydia pomonella* in relation to its food.) [English summary 4 lines.]

Riv. Ortoflorofruttic. ital., 1952, 36: 292-4.

g HEY, G. L.

Orchard results last year with PCPBS.

Grower, 1953, 39: 86-9, illus.

Notes on control of red spider and certain cases of phytotoxicity.



- h KERN, H.  
Zur Vorausbestimmung des Temperaturminimums in Strahlungsnächten. (A method of forecasting temperature minima on radiation nights.)  
*Ber. dtsch. Wetterdienst. U.S. Zone* **42**, 1952, pp. 107-9, bibl. 9.
- i MILLER, P. W.  
Relation of temperature to persistence of strawberry yellows virus complex in strawberry aphid.  
*Plant Dis. Repr.* 1952, **36**: 311-12, bibl. 7, also abstr. in *Phytopathology*, 1952, **42**: 517.
- j MINISTRY OF AGRICULTURE, LONDON.  
Vapour moth [*Orgyia antiqua*].  
*Adv. Leafh. Minist. Agric. Lond.* **25**, revised 1952, pp. 3, illus.
- k MOORE, J. D., AND SLACK, D. A.  
Interaction of strains of necrotic ring spot virus.  
From abstr. in *Phytopathology*, 1952, **42**: 470-1.  
In Montmorency cherry.
- l MÜLLER, H.  
Die Monilia-Krankheit der Obstbäume. (The *Monilia* disease of fruit trees.)  
*Flugbl. biol. Bundesanst. Braunschweig* **K5**, 1952, pp. 5, illus.  
Dealing with brown rot of pome and stone fruits.
- m MÜLLER, H. J., AND UNGER, K.  
Über den Einfluss von Licht, Wind, Temperatur und Luftfeuchtigkeit auf den Befallsflug der Aphiden *Doralis fabae* Scop. und *Myzodes persicae* Sulz. sowie der Psyllide *Trioza nigricornis* Frst. (The influence of light, wind, temperature and air humidity on the flight of the aphids *Doralis fabae* and *Myzodes persicae* and of the psyllid *Trioza nigricornis*.)  
*Züchter*, 1952, **22**: 206-28, bibl. extensive.
- n NYLAND, G.  
Separation of sour cherry yellows and ringspot viruses by passage through the seeds of Stockton Morello.  
From abstr. in *Phytopathology*, 1952, **42**: 517-18.
- o VON OPPENFELD, H., AND OTHERS.  
Cost and effectiveness of different insect and disease control practices in New York apple orchards.  
*Bull. Cornell agric. Exp. Stat.* **886**, 1952, pp. 73, illus.
- p PERIŠIĆ, M.  
Mozaik smokve. (Mosaic on figs in Yugoslavia.) [French summary 4 lines.]  
*Zasht. Bilja*, Belgrade, 1952, No. 9, pp. 62-3, bibl. 5, illus.
- q PETRIK, C.  
Neka zapažanja o pojavi zutotrbe u vojvodini. (Observations on the brown-tail moth *Nygmia phaeorrhoea* in Vojvodina.) [English summary  $\frac{1}{2}$  p.]  
*Zasht. Bilja*, Belgrade, 1952, No. 10, pp. 49-52, bibl. 2.  
In forests, but also on fruit trees, especially apple.
- r SEINHORST, J. W.  
Aaltjesiekten in tuinbouwgewassen. (Eelworms attacking horticultural crops.) [English summary 2 lines.]  
*Meded. Dir. Tuinb.*, 1952, **15**: 773-6, bibl. 8, illus.  
A review of methods of control.
- s STOJANOVIĆ, D.  
Investigations on the possibility of controlling apple scab. [Serbian, with English summary  $\frac{1}{2}$  p.]  
*Zasht. Bilja*, Belgrade, 1952, No. 9, pp. 35-41, bibl. 8.

## WEEDS AND WEED CONTROL.

(See also 2384.)

*Particular weeds.*

1755. FINNERTY, D. W., AND OTHERS.  
Control of annual, winter annual and biennial weeds.

*Res. Rep. 8th annu. N. centr. Weed Control Conf. 1951*, Oklahoma City, pp. 38-52.

Twenty-two abstracts and a summary thereof are presented on the control of weedy grasses and 9 on the control of broad-leaved weeds, followed by a classification of weed responses.

1756. SLIFE, F. W., AND OTHERS.

Control of perennial herbaceous weeds.

*Res. Rep. 8th annu. N. centr. Weed Control Conf. 1951*, Oklahoma City, pp. 1-37.

Results of investigations submitted on the control of individual weed species are summarized for Canada and perennial sow thistles, quack grass, Johnson grass,

leafy spurge, field bindweed, hoary cress, Russian knapweed, toadflax and other perennial herbaceous weeds. A classification is made of weed responses.

1757. WARD, R. K.

A review of the weed control investigations at the Soil Fertility Research Station, Hamilton.

*Paps 2nd nat. Weeds Conf. N.Z.*, 1949, Massey agric. Coll., pp. 11, bibl. 15 [received 1953].

Notes are given on trials started during the 1945-46 season, when 70 plots each were treated for ragwort and Californian thistle, and 56 for blackberry control. During the following 2 seasons work was continued on a similar scale, involving new series of trials on hundreds of plots.

1758. VALDEYRON, G.

Lutte contre les mauvaises herbes. (Weed control.)

Ann. Serv. bot. agron. Tunis., 1950, 23 (suppl.): 24-6 [received 1952].

In experiments at the Agricultural Laboratory on the eradication of couch grass (*Agropyron repens*) with Na trichloroacetate (TCA), a single application of 100 kg. of the active product per ha. or 3 applications of 25 kg. at weekly intervals made before the rainy season gave equally good control, while 2 applications of 50 kg. gave better results than a single application of 100 kg. In treatments made after the rainy season and the September-October floods, the greater the dosage the less was the regrowth. At the beginning of December plots treated with 200 kg., or 3 applications each of 50 kg., showed only a small amount of regrowth. Against *Oxalis cernua* a commercial product containing 45% tar oil and 10% DNC gave satisfactory control at 75 kg./ha., while tar oil alone, even at 125 kg./ha., had little effect.

1759. YEATES, J. S.

Weed-control trials at Massey Agricultural College.

Paps 2nd nat. Weeds Conf. N.Z. 1949, Massey agric. Coll., pp. 5 [received 1953].

Perhaps the worst garden and nursery weed in New Zealand is a species of *Oxalis*, the correct botanical name of which is uncertain. Of the chemicals used only borax and sodium chlorate, each applied at 1 lb. per sq. yd., showed good control of the weed 14 months after treatment. The success of the sodium chlorate treatment was confirmed on a  $\frac{1}{4}$  acre nursery plot where it was applied at the rate of  $\frac{3}{4}$  lb. per sq. yd.; in addition to oxalis it also controlled couch grass.

1760. MILLER, D.

Biological control of weeds.

Paps 2nd nat. Weeds Conf. N.Z. 1949, Massey agric. Coll., pp. 4 [received 1953].

In New Zealand the principal species of weeds studied with a view to biological control have been blackberry, ragwort, piri-piri, gorse, St. John's wort and manuka. The best results were obtained on gorse with the gorse seed weevil, on St. John's wort with a beetle from Australia and on manuka with a scale insect.

### Control of woody plants.

1761. LEONARD, O. A.

Chemical eradication of brush species.

Proc. 3rd annu. Calif. Weed Conf. 1951, Fresno, pp. 61-8, bibl. 1.

2,4-D, 2,4,5-T and their mixtures are reported to control many undesirable woody plants in California, including *Rubus* and *Ribes* spp., *Eucalyptus*, *Ulex europaeus* (gorse), *Quercus* spp. and *Salix*.

1762. MATTHEWS, L. J.

Chemical control of blackberry.

Proc. 4th annu. N.Z. nat. Weeds Conf. 1951, Massey agric. Coll., pp. 3.

The most favourable times for blackberry control with 2,4,5-T were between December [mid-summer] and early February. Results obtained in field trials were confirmed by tip immersion tests, and have shown that water is the best carrier for oil-based esters; the esters

gave better absorption than triethanolamine salts, but the salts were translocated more readily. Since the movement of the hormones is polar, plants with lateral roots such as blackberries are difficult to control and usually require more than one application.

1763. HANSEN, H. L., AND OTHERS.

Control of woody plants.

Res. Rep. 8th annu. centr. Weed Control Conf. 1951, Oklahoma City, pp. 147-64.

Reports have been received of tests of 2 previously untried chemicals for the control of woody species. Both CMU and MCP were found to show some promise on barberry, *Berberis canadensis*, when applied to the ground surface. CMU applied as foliage or basal spray, or in powder form on the ground was effective against post and blackjack oaks, *Quercus stellata* and *Q. marylandica*.

1764. ELWELL, H. M.

Report of brush control investigations on hardwood.

Proc. 8th annu. Mtg N. centr. Weed Control Conf. 1951, Oklahoma City, pp. 72-4.

Methods and materials used for brush control are discussed. The non-selective herbicide CMU (3-p-chlorophenyl 1,1-dimethylurea) was tried for the first time on oaks, and when applied at  $\frac{1}{2}$ , 1 and 2 lb. per gal. of water gave as good or perhaps better results than ammate. Borax sprays were ineffective, but the powder applied near the roots killed oak-brush.

1765. COULTER, L. L.

Two primary factors influencing results in the control of oak during the dormant period.

Proc. 8th annu. Mtg N. centr. Weed Control Conf. 1951, Oklahoma City, pp. 76-7.

The importance of spray volume and point of application is discussed. Data are presented indicating that high volume sprays are more effective than low volume sprays. For example, 4 lb. of 2,4,5-T in 100 gal. of fuel oil applied to the base of white oaks at the rates of 7 or 11 ml. per inch of circumference was considerably superior to 40 lb. of 2,4,5-T applied at 3 ml. per inch of circumference. Placement tests have shown the base of the trees to be the critical area of application. The lethal effects from dormant sprays move upwards or at least appear above the point of application, but do not move downwards much. Perhaps this movement downwards is no farther than the movement of the oil, hence the necessity for using high volumes, which run freely down the stem and crown.

1766. MATTHEWS, L. J.

Experiments in brush control.

Proc. 3rd nat. Weeds Conf. N.Z. 1950, Canterbury agric. Coll., pp. 6-9.

Notes are given on the control of gorse, *Ulex europaeus*, and some other Papilionaceae with 2,4,5-T.

1767. BRODIE, A.

Experiments in chemical control of gorse.

Proc. 3rd nat. Weeds Conf. N.Z. 1950, Canterbury agric. Coll., pp. 21-4.

A combined spray of 2,4,5-T and 2,4-D, called brush-killer, was found to be more effective against gorse than 2,4,5-T alone. The brush-killer in a dieselene base applied during the growing season showed spectacular initial results, but for reasons stated it is recommended



now for winter treatment only, while brush-killer in water was found to give equally good results all the year round. To improve the adhesion of the spray the addition of a small amount of dieselene is suggested in the proportion of  $1\frac{1}{2}$  gal. brush-killer,  $8\frac{1}{2}$  gal. dieselene and 90 gal. water. Thorough spray coverage is of the utmost importance in gorse control, and methods of achieving it, particularly in inaccessible areas, are outlined.

1768. HAMBLYN, C. J.

**Gorse—chemical control trials.**

*Proc. 4th annu. N.Z. nat. Weeds Conf. 1951, Massey agric. Coll., pp. 4.*

The trials described have shown that mixtures of 2,4-D and 2,4,5-T are not so effective for killing gorse as 2,4,5-T alone when compared on an acid equivalent basis per acre. Best results were obtained from applications of 2,4,5-T formulations from November to early March to growing plants. Notes are given on rates applied to various types and stages of growth and on how to obtain adequate coverage.

1769. YEATES, J. S.

**Gorse control on Massey College sheep farm.**

*Proc. 4th annu. N.Z. nat. Weeds Conf. 1951, Massey agric. Coll., pp. 3.*

By burning and spraying with brush-killer in the winter and 2,4,5-T in the summer.

1770. TUCKETT, A. J.

**Practical control of gorse.**

*Proc. 4th annu. N.Z. nat. Weeds Conf. 1951, Massey agric. Coll., pp. 2.*

On land that can be handled with agricultural machinery ploughing or discing is recommended for gorse control, to be followed by 2,4,5-T treatment of re-growth. In hill country the application of 1 gal. of 2,4,5-T in 100 gal. of water per acre is suggested.

**Weed control in fruit crops.**

(See also 1828i, p.)

1771. CROVETTO, R. M.

Las malezas de los montes frutales en el nordeste de Entre Rios. (The weeds of the fruit plantations of north-eastern Entre Rios province [Argentina].)

*Rev. Invest. agric. B. Aires*, 1950, 4: 357-401, bibl. 8, illus. [received 1953].

The article consists chiefly of botanical descriptions of the weeds. There are also short notes on weeds in relation to soil erosion, succession, control and biological classification.

1772. ANON.

**Onkruidbestrijding bij aardbeien. (Weed control in strawberries.)**

*Meded. Proefst. Groent. Fruit. Glas*, 1952, No. 7, p. 2.

Trials were carried out with the herbicides Triherbide I.P.C. and Triherbide N.I.X. for weed control in strawberries, using the variety Jucunda. The materials can be combined, using a mixture of 10 kg. and 20 kg. per ha. respectively, at a rate of 1,000 l. per ha. I.P.C. killed grasses and chickweed, being absorbed through the roots and acting very slowly; no damage was caused to the strawberries. N.I.X. killed plants other

than grasses through the leaves; damage was caused to strawberry leaves but the persistence of this damage depended on the time of spraying and the development of the plants. Spraying in October-November gave better results than spraying during a dry period.

1773. NYLUND, R. E., AND OTHERS.

**Control of weeds in small fruits and ornamentals.**

*Res. Rep. 8th annu. N. centr. Weed Control Conf. 1951, Oklahoma City, pp. 105-11.*

*Strawberries*: The abstracts submitted show that 2,4-D and E.H. No. 1 (sodium 2,4-dichlorophenylethylenedioxy sulphate) were promising, but that E.H. No. 2 (dichloral urea), endothal, xanthogen disulphide, maleic hydrazide, DNOSBP, PCP, CIPC and CMU, at the rates and under the conditions applied, were toxic to the strawberries. DNOSBP-phenol, applied at 1.8 lb. per acre in fuel oil and water in late autumn, gave good weed control and produced only very little permanent crop injury. *Raspberries*: Application of 4 and 6 lb. per acre of E.H.1 in new plantings of red and black raspberries effectively controlled annual weeds without injuring the crop plants. *Tree fruits*: CIPC and maleic hydrazide gave good weed control in sour cherry orchards without damaging the trees, but CMU and TCA, although giving excellent weed control, seriously injured the trees. *Gladiolus*: Good control was obtained with all the herbicides tested and only a high (20 lb.) TCA treatment reduced corm production. *Nursery crops*: E.H.1 and Stoddard Solvent were found safe for *Juniperus virginiana*, *J. procumbens*, *Syringa* and *Philadelphus*, but they damaged *Papaver orientale*.

1774. DENISEN, E. L.

**Chemical control of weeds in everbearing and June bearing strawberries.**

*Proc. 8th annu. Mtg N. centr. Weed Control Conf. 1951, Oklahoma City, pp. 43-4, bibl. 1.*

Crag Herbicide 1 (sodium 2,4-dichlorophenoxy ethyl sulphate), at 4 lb. per acre, applied to the soil following cultivation has proved very effective in weed control in strawberries during 2 seasons in Iowa. A reduction in the runner production of the treated June bearing strawberries noted did not, however, affect yields. In the everbearing types significant yield increases resulted from the herbicidal applications.

1775. HEMPHILL, D. D., AND ROBERTS, W. W.

**Chemical weed control in strawberries.**

*Proc. 8th annu. Mtg N. centr. Weed Control Conf. 1951, Oklahoma City, pp. 44-6.*

Of the 15 chemicals tested for herbicidal use in strawberries, 2,4-D and sodium 2,4-dichlorophenylethylenedioxy sulphate (E.H.1) appeared most promising under Missouri conditions. Both herbicides, however, reduced runner production, and had insufficient residual properties. The effects of the materials applied at different stages of development of the strawberries are noted.

1776. BREAK, R. A.

**Eradication of Johnson grass in the vine row in Fresno county.**

*Proc. 3rd annu. Calif. Weed Conf. 1951, Fresno, pp. 23-7.*

On a test plot 9 treatments with straight low grade

diesel oil or Shell No. 20 over 2 seasons, using a total of 290 gal. per acre, eradicated Johnson grass. During the same period 12 applications of a mixture of diesel oil and Dow General in water reduced infestation only by about 50%. For best results it is recommended to begin the treatment early in the season and finish before 15 June. Spraying between the stems of the vines is often necessary, but no application should be made to stems of vines less than 4 years old without some added protection, nor should stems girdled during the current season be sprayed.

1777. LEONTJEVA, JU. A., AND GERASIMOV, B. S.  
The use of 2,4-D herbicide in vineyards.  
[Russian.]  
*Vinodelie i Vinogradarstvo*, 1952, No. 11,  
pp. 37-40, illus.

Very effective weed control was obtained in vineyards by applying carefully an 0.2% aqueous solution of 2,4-D between the rows. The herbicide was also very valuable for killing undesirable vine stocks. In Novočerkask spraying 2,4-D on a 2.8 ha. vineyard severely infested with phylloxera was found to be 20 times more economical than the usual laborious method of clearing the land.

#### *Weed control in ornamentals and turf.*

1778. DAWSON, C. P.  
Premerge controls weeds in gladiolus.  
*Down to Earth*, 1952, 8 (3): 9.

The following treatments with Pmerge herbicide gave complete control of weeds and grass in gladiolus at Louisville, Kentucky: (1) April plantings—1 qt to 18 gal. water per 1,000 ft. of row sprayed in a 12-inch band; (2) June-July plantings (temperature 100° F.)—4 gal. to 300 gal. water per acre.

1779. MADDEN, E. A.  
Weeds in lawns and playing areas.  
*Proc. 3rd nat. Weeds Conf. N.Z.* 1950,  
Canterbury agric. Coll., pp. 61-7 [received  
1953].

An interesting paper on lawn maintenance with notes on the commoner weeds invading turf in New Zealand and how to eradicate them. Practically all lawn weeds can be dealt with quite effectively by creating unfavourable conditions for their growth, and most of the others can be killed with arsenic pentoxide. Hormone sprays are mentioned.

1780. GREENFIELD, I.  
The moss problem mastered.  
*Gdnrs' Chron.*, 1952, 132: 232, illus.

During further work at Tilgate Research Station [see *H.A.*, 19: 2082] a lawn sand based on a non-poisonous mercurial compound was developed which controlled moss in lawns for 12 months and, in addition, killed broad-leaved weeds and stimulated the grass. Results of a comparative trial with this product and an organic fertilizer combined with a weed killer showed that the mercury product was more than 7 times as effective for moss control as the fertilizer plus herbicide, and that it produced a significant improvement in the grass. The control of broad-leaved weeds was about equal. [Neither formulations nor doses are given.]

1781. LANTZ, H. L.  
Experiments with chemical control of crab grass in 1951.  
*Proc. 8th annu. Mtg N. centr. Weed Control Conf.* 1951, Oklahoma City, pp. 47-8.

Small crab grass, *Digitaria ischaemum*, infesting a golf course was effectively controlled by 2 treatments of phenyl mercury compounds applied at the rate of 2½ oz. per 1,000 sq. ft. Potassium cyanate, applied as a spray at 8 and 12 lb. per acre, caused some discoloration but no permanent injury to the bluegrass turf.

1782. GRIGSBY, B. H.  
Preliminary report on the use of chlordane for the control of crab grass.  
*Proc. 8th annu. Mtg N. centr. Weed Control Conf.* 1951, Oklahoma City, pp. 48-9,  
bibl. 1.

1. Applications of 5-25 lb. chlordane to soil in which crabgrass seeds were germinating reduced the emergence of crabgrass seedlings. 2. Foliage applications of 5 to 10 lb. chlordane per acre in a refined oil carrier gave a rapid kill of crabgrass without injury to lawn grass. 3. Crabgrass plants can be killed at any stage of growth by the mixture. 4. Bent grasses appear to be tolerant of the oil-chlordane mixture. 5. Chickweed can be killed about as readily as crabgrass with chlordane in oil. [Author's summary.]

1783. PIRONE, P. P.  
Controlling crabgrass and other weeds with chemicals.  
*Gdn J. N.Y. bot. Gdn*, 1951, 1: 47, 57.

Cultural and chemical practices for the control of crabgrass are described. The latter consist of the spray application of (1) 3 oz. K cyanate to 3 gal. water per 1,000 sq. ft. once or twice at weekly intervals at any development stage well before seed production but preferably during vigorous growth or, for very large areas, 8 lb. "aerocyanate" to 100 gal. water per acre; (2) 2½ oz. 10% PMAS (a poisonous, caustic, water-soluble phenyl organic mercury complex) in 5 gal. water per 1,000 sq. ft. thrice at 10-day intervals at any time between mid-June and early September but well before the crabgrass reaches maturity. Chemical methods of controlling other weeds are also described.

#### *Weed control in the tropics.*

(See also 1828b, e, j, 1, 2342.)

1784. JOHNSON, F. S.  
Report on preliminary investigation on chemical weed control in Venezuela 1951.  
(Publ.) IBEC\* Res. Inst., New York, 1952,  
pp. 20, illus.

Early in 1951 the IBEC Research Institute started a comprehensive agricultural chemical programme in Venezuela. Initial studies are concerned specifically with the problems of weed control in the tropics. These studies indicate that the lack of a satisfactory weed control method is the most important single factor impeding the development of modern mechanized agriculture in the lower tropical areas. Until this problem is solved vast tropical areas of potentially productive agricultural land will remain in grazing or

\* International Basic Economy Corporation, New York



perennial crops. The first year's work has been concentrated on chemical weed control, particularly pre-emergence applications, on several of the important annual food crops of Venezuela. Initial results indicate the feasibility of this type of weed control on corn, rice, beans, and potatoes. Pre-emergence control with several "dinitro" compounds was particularly successful. This preliminary work indicates that in some cases the initial cost of chemical treatment is higher than present hand and mechanical methods of weed control. However, increased yields and assurance of mechanical harvesting give the farmers an increased net income. [From author's summary.]

1785. NORRIE, J. C.  
Progress in chemical weed control in Australia.  
*Proc. 4th annu. N.Z. nat. Weeds Conf. 1951*,  
Massey agric. Coll., pp. 4.

Among the more successful uses of herbicides in tropical crops is the application of sodium 2,4-D at 4 lb. per acre to sugar cane fields, giving adequate weed control for a period of 8 to 21 weeks. In pineapples 10 to 15 lb. of sodium pentachlorophenate per acre, applied after cultivation, gives almost complete control for 6 to 8 weeks. Further sprayings can extend this period up to 4 months. For the destruction of exhausted banana plantations 2,4-D is injected into the main stem of the plants, resulting in almost 100% kill.

1786. CANNON, R. C.  
Weed sprays in pineapples.  
*Qd agric. J.*, 1952, 75: 139-41.

In recent years pre-emergence control of weeds in Queensland pineapples with PCP (pentachlorophenol and sodium pentachlorophenate) has been practised on a commercial scale with consistently good results. Sprays containing PCP alone, at least at the strengths used for pre-emergence treatment, are of little value as contact sprays. The addition of suitable oils, however, increases their efficiency. Combination sprays of 3 lb. of PCP and 1 gal. of mineral oil or creosote emulsion per 100 gal. have been found to give complete control of broad-leaved weeds; grasses are more tolerant and need higher concentrations.

1787. RUBBER RESEARCH INSTITUTE OF MALAYA.  
Weed control on rubber estates.  
*Plant. Bull. Rubb. Res. Inst. Malaya*, 1953,  
No. 4, pp. 2-8.

Notes are given on the control of *Imperata cylindrica* with sodium arsenite, oils and fortified oils, sodium trichloracetate, ammonium sulphamate, and oil emulsions and fortified emulsions; and on the chemical control of other grasses, broad-leaved bushes and other plants. Many of the treatments mentioned are experimental and it is stressed that only the fringe of the problem has yet been touched. Effective control of *Imperata cylindrica* is obtainable with up to 10 sprayings of 6-9 lb. Na arsenite plus 0.05% spreader in 60 gal. water per acre at 9/10 day intervals. 5-6 sprayings of aromatic gas or diesel oil at 60 gal. per acre is as effective but more expensive than Na arsenite; fortification of the oil with pentachlorophenol or 2,4-D did not improve the results.

1788. VAN ALPHEN DE VEER, E. J., AND VINK, A. P. A.  
Bestrijding van alang-alang met mechanische en chemische middelen. (Mechanical and chemical control of lalang grass.)  
[English summary  $\frac{3}{4}$  p.]  
*Bergcultures*, 1952, 21: 468-81, bibl. 6, illus., also in *Tectona*, 1952, 12: 97-116.

Co-operative trials were carried out in 1951 by the C.P.V. Research Station and the Forest Research Institute, both at Bogor, Java, to compare the effectiveness of chemical and mechanical methods of controlling lalang grass (*Imperata cylindrica*). Shell weedkillers K and T were applied 3 and 4 times at various rates, and shallow mechanical cultivation (6 in.) was carried out with a Rome ploughing harrow 4 times, 3 times, or twice followed by an application of weedkiller K. The weedkiller treatments did not give effective control of lalang. Shallow cultivation, however, either 3 or 4 times, was remarkably successful. The importance is stressed of establishing a leguminous cover crop as soon as possible after the land has been cleared, and recommendations are made for suitable crops and soil treatments. It is pointed out that in some cases deep ploughing may be more suitable than shallow cultivation, and that the treatment must depend on soil type and climate. Mention is finally made of a new Shell weedkiller, E.F.140, which when used in diesel oil solution has been recommended for lalang control in plantations. The cost, however, would be higher than that of mechanical cultivation and it would cause a fire hazard. In aqueous solution it may be used in combination with mechanical cultivation to control broad-leaved weeds.

1789. THAKUR, C.  
Effect of MCP on nutgrass.  
*Agron. J.*, 1952, 44: 589-90.

Equal plots, 10 by 10 feet, with almost equal infestation of the weed, *Cyperus rotundus*, at Pusa, Bihar, India, were sprayed with 0.5%, 1%, 2%, 2.5%, and 3% MCP (2-methyl-4-chloro-phenoxyacetic acid) at the rate of 100 gallons per acre during the "kharif" season (August-September). Experiments were repeated in different fields in the same locality. It took about 15 days to kill the top growth of weed plants in plots treated with 0.5%, 12 days with 1%, 10 days with 2%, 8-9 days with 2.5%, and about a week with 3% dosage. Tubers from the affected fields failed to sprout along with unaffected ones when replanted in a separate place. Cane-sets when planted in the treated and untreated plots showed no difference in sprouting. [Author's summary.]

1790. MCCALL, G.  
The control of Johnson grass.  
*Proc. 8th annu. Mtg N. centr. Weed Control Conf. 1951*, Oklahoma City, pp. 68-70.

Generally Johnson grass can be controlled by cultural methods, but when the aid of chemicals is required 50-100 lb. of TCA or 100-200 lb. of sodium chlorate per acre are recommended for use on cropped land. For uncultivated areas higher rates of sodium chlorate, and mixtures containing the chemical are suggested. Of the newer herbicides, CMU shows some promise.

1791. LEONARD, O. A., AND HARRIS, V. C.

The effect of aliphatic hydrocarbons on the hypocotyls of cotton and soybeans and on the shoots of nut grass, Johnson grass and other weeds by the directional spray technique.

*Weeds*, N. Y., 1952, 1: 256-73, bibl. 14, being *J. Art. Miss. agric. Exp. Stat.* 273.

Olefins were somewhat more injurious to grass and nut-grass than were the paraffins and injury was produced more rapidly. The most effective hydrocarbons against Johnson grass were those that contained 10 to 12 carbon atoms. [From authors' summary.]

1792. MEHTA, P. R., AND GUPTA, S. L.

Eradication of *Cuscuta reflexa*, Roxb. by weedicides.

*Agric. Anim. Husb. U.P.*, 1951, 2 (3): 26-8, bibl. 3 [received Dec. 1952].

The parasite *Cuscuta reflexa* growing on *Inga dulcis* and *Tecoma stans* was killed by a single spray application of 1% or 2% Dicotox (a 2,4-D ester preparation) or of 2% Methoxone (sodium MCPA). The inga appeared to be little affected by 1% Dicotox, but the tecoma showed more injury especially with Methoxone. Further work is in progress.

1793. TANDON, R. K.

The use of 2,4-D in the control of *baisuri* (*Pluchea lanceolata*).

*Agric. Anim. Husb. U.P.*, 1951, 1 (9): 9-11 [received Dec. 1952].

From 65% to 90% kill of *Pluchea lanceolata* was obtained with 2 applications 10 days apart of 2,4-D applied as 1-25 to 5 lb. Fernoxone in 100 gal. water per acre. Rates of 7.5 and 10 lb. per acre gave 100% kill.

### Weed control in vegetable crops.

(See also 1828f, i.)

1794. PETERSEN, H. I.

Forsøg med ukrudtsbekaempelse i køkke-nurter, I. Gulerødder, selleri, kepaløg og porrer. (Experiments on weed control in vegetables. I. Carrots, celery, onions and leeks.) [English summary 2 pp.]

*Tidsskr. Planteavl*, 1952, 56: 87-109, being *Beret. Statens Forsøgsvirks. Planteakult.* 462.

Data are tabulated and results are discussed of experiments on weed control in carrots (in hotbeds and in the field) and in celery (in transplanting beds) with petroleum sprays, in onions with flame throwers as well as with petroleum and other compounds, and in leeks with aerocyanate. Concentration and rate of application are recommended in each case and phytotoxic effects and the susceptibility of individual weed species to the treatment are noted. The trials were carried out from 1949 to 1951 at the Danish Institute for Weed Research and at several experiment stations.

1795. HOLM, L.

TCA for weed control in horticultural crops.

*Proc. 8th annu. Mtg N. centr. Weed Control Conf.* 1951, Oklahoma City, pp. 39-41.

Tables are presented showing the effects of TCA and TCA plus PCP applied for pre-emergence weed control

in spinach, rutabagas and turnips, carrots and gladiolus. Other crops less extensively studied during the 1951 season were cabbage, tomatoes, rhubarb, celery and asparagus.

1796. WARREN, G. F.

Weed control in certain vegetable crops with N-1-naphthyl phthalamic acid.

*Proc. 8th annu. Mtg N. centr. Weed Control Conf.* 1951, Oklahoma City, p. 41, bibl. 5.

A brief review of literature is given indicating that N-1-naphthyl phthalamic acid and its formulations may have a definite place as selective herbicides in certain vegetables such as cucurbits, asparagus and beans.

1797. ALBAN, E. K.

Chemical weed control in asparagus.

*Proc. 8th annu. Mtg N. centr. Weed Control Conf.* 1951, Oklahoma City, pp. 34-6.

From this summary of methods and materials used for weed control in asparagus it is concluded that the standard practice of disking under the tops and cultivation between the rows should be continued even though herbicides are used in the production of the crop. There appears to be a decided advantage in applying different kinds of herbicides rather than using a single chemical throughout the season or for several seasons.

1798. COULTER, L. L.

Experiments with DNOSBP for pre-emergence and post-emergence weed control in lima beans.

*Proc. 8th annu. Mtg N. centr. Weed Control Conf.* 1951, Oklahoma City, pp. 37-8, bibl. 2.

Evidence is presented indicating that Fordhook 242 variety of lima bean can be sprayed with sufficient amounts of DNOSBP for weed control even after the plants have reached the primary leaf stage. Highest yield of marketable pods and best weed control was obtained from a pre-emergence application at 6 lb. per acre, but the same amount applied when the hypocotyls of the beans were emerging produced almost equally good results.

1799. TIBBITS, T. W.

Chemical weed control in red beets.

*Proc. 8th annu. Mtg N. centr. Weed Control Conf.* 1951, Oklahoma City, pp. 36-7.

Experiments in Wisconsin show that TCA has given the most consistent results of the compounds tested for weed control in beetroots. Post-emergence treatments have been less effective than pre-emergence treatments. Perhaps the most interesting findings of last season's work are the indications that TCA does not persist in vegetable soils from the previous year and that beets will tolerate Endothal at rates which have given very outstanding control of both broadleaved and grassy weeds.

1800. LIVINGSTON, G. A.

Control of careless weeds in cantaloupe plantings.

*Proc. 7th Annu. Rio Grande Valley hort. Inst.*, 1953, pp. 59-62, illus.

Several formulations of Alanap (N-1 naphthyl phthalamic acid) applied as pre-emergence sprays at 4 lb. or



more per acre gave fair to excellent control of careless weeds (*Amaranthus* spp.) and Johnson grass (*Sorghum halepense*) in cantaloupe plots. The residual effect of the material was good and neither drought nor irrigation tended to reduce its efficiency. The cantaloupe seedlings were stunted for a short time after germination but recovery was completed within 2-3 weeks. Seed from treated plots showed normal germination and subsequent growth.

1801. MEADOR, D. B., AND HEMPHILL, D. D.  
Pre-emergence weed control in cucurbits.  
*Proc. 8th annu. Mtg N. centr. Weed Control Conf. 1951*, Oklahoma City, pp. 38-9.

During an unfavourable growing season in Columbia, Premerge and NPA, each applied at 4 lb. per acre, showed some promise for pre-emergence weed control in cucurbits.

1802. HAVIS, J. R.  
Comments on selective herbicides for kale and broccoli.  
*Weeds, N.Y.*, 1952, 1: 189.

The most promising of the herbicides tested at the Virginia Agricultural Experiment Station was KOCN. Both broccoli and the Dwarf Blue Curled Scotch variety of kale were safely sprayed with 1.0 or 1.5% KOCN at the rate of 72 gal. per acre, after the crop plants developed true leaves. The herbicide was, however, ineffective against purslane and lambs quarter [*Chenopodium album*] encountered in the plots.

1803. MUNDY, T. R.  
Sulphuric acid spraying of onions.  
*Proc. 3rd nat. Weeds Conf. N.Z. 1950*, Canterbury agric. Coll., pp. 68-72 [received 1953].

A description is given of a combined chemical, mechanical and manual weeding programme in onions, giving excellent results at the cost of £9 1s. per acre. Sulphuric acid at the rate of 9 gal. per 81 gal. of water plus 1 pt. of white oil was applied pre-emergence, the treatment being repeated without the oil when the onions were 4-5 in. high. Later in the season, but before the onions reached the bulbing stage, 2 inter-row cultivations were carried out, followed by hand weeding as required.

1804. WARREN, G. F., AND OTHERS.  
Control of weeds in vegetable crops.  
*Res. Rep. 8th annu. N. centr. Weed Control Conf. 1951*, Oklahoma City, pp. 121-37.

*Onions*: In pre-emergence treatments on muck soils, good weed control without crop injury was obtained with CMU at  $\frac{1}{2}$  to 1 lb. per acre, and with Stoddard Solvent. *Beans*: Pre-emergence treatments with PCP at 10 to 24 lb. and DNOSBP at 2 and 10 lb. per acre gave fair to excellent weed control and caused little or no injury to the beans. Other crops in which successful or promising weed control is reported are peas, beets, cucurbits, spinach, carrots, asparagus, peppermint and direct seeded tomatoes.

1805. BLAIR, G. H.  
Low volume chemical weed control in peas.  
*Proc. 3rd nat. Weeds Conf. N.Z. 1950*, Canterbury agric. Coll., pp. 41-4 [received 1953].

A series of experiments is described which showed the MCPA type of hormone spray Phenoxylene, and the

dinitro butyl phenols, Sinox W and Sevtox, to be most suitable for weed control in peas.

1806. LEEFE, J. S.  
Chemical control of weeds in peas.

*Sci. Agric.*, 1952, 32: 581-5, bibl. 7, illus.

In three years' trials a pre-emergence application of the amine salts of DNOSBP (dinitro-*o*-sec-butyl phenol), 54%, at the rate of 4 or 8 qt. per acre was the only treatment that nearly suppressed weeds in peas up to harvest time.—Dom. exp. Stat., Kentville, N.S.

1807. CARSTENS, M. W.  
Weed sprays help pea industry in Pacific Northwest.

*Down to Earth*, 1952, 8 (3): 4-6, illus.

In western Washington successful control of weeds in canning pea crops is obtained with the following concentrations of ammonium dinitro secondary butyl phenate at 70-100 gal. per acre: at 60-65° F.—4 qt of 13.7% concentrate per 100 gal. water; at 65-70° F.—3  $\frac{1}{2}$  qt; at 70° F. and over—3 qt. High volume-low pressure treatment is essential as the selective action depends upon the application of coarse drops that roll off the waxy leaves and stems of the peas. Against annual weeds the spray should be applied as soon as most weed seedlings have emerged. Against perennial weeds spraying should take place when the peas are 6-8 in. high and a greater volume and a slightly higher concentration should be used. Treatment should not be given when rain is expected within 8-10 hours, and it is not efficacious at temperatures below 60° F. No variety has been found susceptible to the treatment described. Notes on equipment are given.—N.W. Washington Exp. Stat.

1808. DUNCAN, A. A.  
Thistle—experimental work in chemical control.  
*Proc. 4th annu. N.Z. nat. Weeds Conf. 1951*, Massey agric. Coll., pp. 3.

Denoc and DNBP applied to very young Californian thistle, *Cirsium arvense*, checked its growth sufficiently to allow a successful pea crop to be harvested. In another trial with Partridge peas 0.5 lb. MCP gave satisfactory control of the thistle.

1809. LIVINGSTON, G. A.  
Preliminary report on the reaction of radish plants to treatments with Chloro IPC.  
*Proc. 7th Annu. Rio Grande Valley hort. Inst.*, 1953, pp. 63-6, illus.

Plots of field grown radishes were treated with 0.5 and 10 lb. of Chloro IPC (isopropyl N-(3-chlorophenyl)carbamate) per acre as a pre-emergence spray. The plants from the plots treated with Chloro IPC exhibited an elongated but thinner fleshy axis than did those from the control plots. The length of the fleshy axis of the plant derived from the radicle was not noticeably affected by the treatment. Therefore, the elongation due to the treatment was primarily restricted to the fleshy axis of the plant derived from the hypocotyl. [Author's summary.]

1810. LANA, E. P.  
Four years study of pre-emergence sprays on direct seeded tomatoes.  
*Proc. 8th annu. Mtg N. centr. Weed Control Conf. 1951*, Oklahoma City, pp. 42-3.

In trials conducted in Iowa, Stanisol at 80 gal. per acre and TCA at 4 to 8 lb. per acre were the only promising herbicides for direct seeded tomatoes. The other materials tested, particularly the 2,4-D derivatives, were toxic to the crop.

### *Weed control in waterways.*

(See also 1828o.)

1811. WARD, R. K.

#### **Control of weeds in drains.**

*Proc. 4th annu. N.Z. nat. Weeds Conf. 1951,*

Massey agric. Coll., pp. 2.

Notes are given on trials to control poa grass (*Glyceria aquatica*), which, while valuable as stock food, causes blockages in canals. Of the chemicals tested sodium chlorate at 400 lb. per acre applied as a spray gave the best results.—Rukuhia Soil Res. Stat., Hamilton.

1812. GORDON, D. V.

#### **Control of weeds in drains.**

*Proc. 4th annu. N.Z. nat. Weeds Conf. 1951,*

Massey agric. Coll., pp. 2.

Methods involving sodium chlorate and/or TCA alone or possibly in conjunction with 2,4-D were found promising for weed control in farm drains and ditches.

1813. SAXBY, S. H.

#### **Water hyacinth.**

*Proc. 4th annu. N.Z. nat. Weeds Conf. 1951,*

Massey agric. Coll., pp. 2.

For the control of water hyacinths a combination of manual removal and spraying with hormone weedkillers is recommended.

1814. MYERS, L. F.

#### **The toxicity of oil herbicides to *Paspalum dilatatum* Poir.: effect of composition of the oil.**

*Aust. J. agric. Res.*, 1952, 3: 372-84, bibl. 13.

Hydrocarbon oils of varying boiling range and percentage "aromatic" fraction were tested for their toxicity to *Paspalum dilatatum* (a serious weed of irrigation channels) in the field and glasshouse. Contact injury and final toxicity are separate phenomena and are controlled by different factors. The contact effect of oil herbicides depended on the proportion of aromatic fraction in the oil. The minimum percentage of aromatics required to produce rapid contact injury increases with increasing boiling-point of the oil. Mid boiling-point was shown to be an important and consistent factor in oil toxicity as measured by regrowth. Oil toxicity increases with mid boiling-point of the oil. Toxicity in the field decreases with increasing aromatics. In the glasshouse the reverse is the case. [Author's summary.]

### *Herbicides.*

(See also 1491, 1828g, h, m, n.)

1815. DUTTON, W. C.

#### **Summary of results with new herbicides.**

*Proc. 8th annu. Mtg N. centr. Weed Control*

*Conf. 1951, Oklahoma City, pp. 106-8.*

DUTTON, W. C., AND OTHERS.

#### **New herbicides.**

*Res. Rep. 8th annu. N. centr. Weed Control*

*Conf. 1951, Oklahoma City, pp. 138-46.*

The information presented is based on nearly 100

abstracts dealing with 17 chemical compounds. CMU was the most widely tested herbicide, followed by endothal and chloro IPC.

1816. LEVI, E., AND CRAFTS, A. S.

#### **Toxicity of maleic hydrazide in California soils.**

LEVI, E., AND CRAFTS, A. S.

#### **Toxicity of phenyl mercuric compounds in California soils.**

HARVEY, W. A., AND CRAFTS, A. S.

#### **Toxicity of pentachlorophenol and its sodium salt in three yolo soils.**

HARVEY, W. A.

#### **Toxicity of three 2,4-D formulations in California soils.**

*Hilgardia*, 1952, 21: 431-63, bibl. 14, illus.; 465-85, bibl. 3, illus.; 487-98, bibl. 10; and 499-513, bibl. 6, respectively.

Residual toxicity and rate of inactivation in different soil types are discussed for four herbicides often applied for pre-emergence weed control. Carrots, peas, watermelons and crabgrass were among the test plants used.

1817. ANDERSON, W. P., LINDER, P. J., AND MITCHELL, J. W.

#### **Evaporation of some plant growth regulators and its possible effect on their activity.**

*Science*, 1952, 116: 502-3, bibl. 5.

Three of the six plant growth-regulating substances examined, viz. 2,4-D ethyl ester, IPC and 3-chloroisopropyl-N-phenyl carbamate (3-Cl-IPC), were found to have relatively rapid rates of evaporation, whereas 2,4-D,  $\alpha$ -naphthaleneacetic acid and (4-hydroxy-5-isopropyl-2-methylphenyl)trimethyl ammonium chloride, 1-piperidine carboxylate (Amo 1618) did not evaporate appreciably under the conditions of the experiment. From these results it would appear that, when growth-regulating compounds such as IPC and 3-Cl-IPC are used as herbicides at high temperatures, they may evaporate in sufficient amounts to reduce their effectiveness.—Bur. Plant Ind., Beltsville, Md.

1818. JAGENDORF, A. T.

#### **An atypical growth of cabbage seedling roots.**

#### **II. The nitrogen co-factor and relationship to auxin activity.**

*Amer. J. Bot.*, 1952, 39: 546-52, bibl. 18, illus.

Data pertinent to the problem of the mechanism of herbicides and of their relationship to other synthetic plant growth substances of a non-herbicidal nature were obtained in this study of the induction of atypical growth in cabbage seedling roots by para-chlorophenoxyacetic acid (POA), indoleacetic acid and naphthaleneacetic acid. The type of malformation caused by the 2 latter is the same, and is different from that caused by POA. Detailed results are given. It is concluded that the malformation of the type caused by POA is a POA-specific effect, basically unrelated to its auxin activity.—University of California.

1819. KRATOCHVIL, D. E.

#### **Determinations of the effect of several herbicides on soil microorganisms.**

*Weeds*, N.Y., 1951, 1: 25-31, bibl. 13, being *J. Pap. S. Dak. agric. Exp. Stat.* 264 [received 1953].



Of the 8 herbicides tested, TCA, PCP, IPC and E.H. No. 2 (dichloralurea) brought about a significant reduction in soil microbial activity, 2,4-D, 2,4,5-T and endothal at the rates applied had no significant influence, and E.H. No. 1 (sodium 2,4-dichlorophenyl "cellosolve" sulphate) had a stimulating effect.

1820. FREED, V. H.

**Some factors influencing the herbicidal efficacy of isopropyl N phenyl carbamate.**  
*Weeds, N.Y., 1951, 1: 48-60, bibl. 26, being Tech. Pap. Ore. agric. Exp. Stat. 696 [received 1953].*

A discussion of certain specific conditions necessary to obtain maximum effectiveness with IPC.

1821. ENNIS, W. B., JR.

**Influence of different carriers upon the inhibitory properties of growth-regulatory sprays.**  
*Weeds, N.Y., 1951, 1: 43-7, bibl. 5 [received 1953].*

Oil and oil-emulsion sprays of 2,4-D and 2,4,5-T were more inhibitory to kidney beans, among other crops, than wholly aqueous sprays. The addition of wetting agents, oils or oil-emulsions increased the inhibitory effectiveness of aqueous sprays of 2,4-D and 2,4,5-T. [See also *H.A.*, 22: 2514.]

1822. ENNIS, W. B., JR., WILLIAMSON, R. E., AND DORSCHNER, K. P.

**Studies on spray retention by leaves of different plants.**  
*Weeds, N.Y., 1952, 1: 274-86, bibl. 9.*

The retention of 2,4-D applied in different carriers was observed on 3 types of soya bean, some vegetables, tobacco and other crop and weed plants. Uniform size droplets of water solutions containing certain surface-active agents and aqueous preparations of different forms of 2,4-D varied greatly in their behaviour when impinging on the leaves of different plants. Some species retained wholly aqueous droplets as readily as those containing surface-active agents. The upper and lower surfaces of leaves differed in their capacity for retaining droplets. Surface-wetting agents varied in their wetting characteristics, and careful choice of the form of herbicide and carrier may improve the selectivity of sprays. Herbicidal sprays applied for non-selective killing of plants are usually improved by the addition of some surface-active agents.

1823. RIPPER, W. E., AND BAKER, C.

**The relative toxicity of 2:4-dichlorophenoxyacetic acid and 2-methyl-4-chlorophenoxyacetic acid to annual weeds.**  
*J. Sci. Food Agric., 1952, 3: 561-7, bibl. 8.*

The toxicity ratio of MCPA and 2,4-D to mustard, *Brassica alba*, has been found to vary with: the interval at which observations are made after spraying; the dosage applied; the incidence of rain after spraying; and the particular salt used, i.e. sodium or amine. In general, it is concluded that the toxicities of the two materials to annual weeds are similar, so long as dry weather prevails after spraying. If rain falls within 12 hrs of spraying, sodium MCPA shows higher toxicity than sodium 2,4-D, a matter of considerable practical importance in climates with frequent rains.

1824. LOOMIS, W. E., AND OTHERS.

**Basic sciences.**

*Res. Rep. 8th annu. N. centr. Weed Control Conf. 1951, Oklahoma City, pp. 177-83.*

Among the important results reported are that adenine sulphate is antagonistic to 2,4-D toxicity and that 2,4,5-T is activated by low concentrations of 2,4-D. Suspensions of activated carbon used to coat peas, or placing loose carbon in the soil above the seeds protected the emerging seedlings from 2,4-D injury.

1825. MILLER, H. J.

**Plant hormone activity of substituted benzoic acids and related compounds.**

*Weeds, N.Y., 1952, 1: 185-8, bibl. 1, illus.*

In trials conducted by a manufacturing firm, practically no growth inhibition was obtained with p-chlorobenzoic and 3,4-dichlorobenzoic acids. Tetra- and pentachlorobenzoic acids completely inhibited the growth of beans at 0.25% concentration, killing the plants in some tests.

*Apparatus.*

(See also 1828a.)

1826. POWELL, S. C.

**A hand-operated rotary weeder.**

*J. Aust. Inst. agric. Sci., 1952, 18: 222-3, illus.*

A tool is described and illustrated which is operated vertically over the centre of each plant in spaced rows. It has several advantages over the conventional hand hoe and has proved particularly effective in destroying weeds, especially *Poa annua*, during wet winter conditions at the Pasture Research Station, Burnley. [Although designed for pasture research, this tool would seem to be of wider interest for vegetables and field crops.—ED.]

1827. RIES, S. K., AND TERRY, C. W.

**The design and evaluation of a small-plot sprayer.**

*Weeds, N.Y., 1952, 1: 160-73, bibl. 6, illus., being Pap. Dep. Veg. Cornell Univ. 346.*

A description is given of a small-plot sprayer which combines the desirable features of existing equipment with the additional advantages of low cost, suitability for plots from 32 to 96 sq. ft. in area, and agitation of the spray liquid. 2,4-D was used to evaluate the equipment, with factors such as size of plot, walking speed and herbicidal contamination taken into account.

*Noted.*

1828.

a AKESSON, N. B.

**Elements of weed sprayer construction and use.**

*Proc. 3rd annu. Calif. Weed Conf. 1951, Fresno, pp. 91-6.*

b BARRERA, A.

**Weeds in the sugar cane fields of Negros Occidental.**

*J. Soil Sci. Soc. Philipp., 1952, 4: 95-100, illus., from abstr. in DocumBl. trop. Prod. Amst., 1952, 7: 702.*

An illustrated list.

- c DUNHAM, R. S.  
Control of annual grasses.  
*Proc. 8th annu. Mtg N. centr. Weed Control Conf. 1951*, Oklahoma City, pp. 67-8.  
A review.
- d GAERTNER, E. E.  
Observations on the host range of *Cuscuta europea* among the Compositae.  
*Canad. J. Bot.*, 1952, 30: 682-4, bibl. 3.
- e GIBBENS, R. T., JR.  
Control of Johnson grass on Cinclare properties.  
*Sugar J.*, 1953, 15 (8): 30-2.  
Cost and effect on sugar cane yield of 2,4-D and TCA treatment.
- f GIBSON, J. W.  
Chemical weed control.  
*Proc. 7th Annu. Rio Grande Valley hort. Inst.*, 1953, pp. 48-54.  
Including weed control in vegetables and gladiolus.
- g HANSEN, J. R., AND BUCHHOLTZ, K. P.  
Inactivation of 2,4-D by riboflavin in light.  
*Weeds*, N. Y., 1952, 1: 237-42, bibl. 5.  
Maize seedlings used as test plants.
- h HOLZ, W., AND RICHTER, W.  
Versuche mit 2,4 D zur Bekämpfung des Duwocks (*Equisetum palustre* L.). (The control of marsh horsetail with 2,4-D.)  
*Landw. Forsch.*, 1952, 4: 177-82, bibl. 4.
- i KENNADY, J. W.  
Chemical weed control.  
*Proc. 7th Annu. Rio Grande Valley hort. Inst.*, 1953, pp. 55-8.  
Including that in vegetables, strawberries and citrus.
- j KING, N. C.  
Chemical weed killers.  
*S. Afr. Sugar J.*, 1952, 36: 699.  
Notes on work at Mount Edgecombe Sugar Experiment Station with 2,4-D and contact sprays.
- k KROCHMAL, A.  
Seeds of weedy *Euphorbia* species and their identification.  
*Weeds*, N. Y., 1952, 1: 243-55, bibl. 24, illus.
- l OYER, E. B., GRIES, G. A., AND LEE, O. C.  
The seasonal development of Johnson grass plants.  
*Proc. 8th annu. Mtg N. centr. Weed Control Conf. 1951*, Oklahoma City, pp. 62-3.
- m REPP, G.  
Zur Kenntnis der Selektivwirkungen von 2,4-D-Verbindungen I. Physiologische Reaktionen resistenter und empfindlicher Pflanzen und ihre ökologische Auswirkung. (The selective action of 2,4-D compounds I. Physiological reactions of resistant and susceptible species and their ecological effects.) [English summary 6 lines.]  
*PflSch. Ber. Wien*, 1952, 9: 161-81, bibl. 33.
- n ROWE, V. K.  
Health hazards associated with the handling and use of herbicides.  
*Proc. 8th annu. Mtg N. centr. Weed Control Conf. 1951*, Oklahoma City, pp. 90-3, bibl. 13.  
Hazards presented by 15 commonly used herbicides.
- o SENARATNE, J. E.  
Preliminary trials for the control of the water fern (*Salvinia*).  
*Trop. Agriculturist*, 1952, 108: 49-50.  
With 2,4-D and 2,4,5-T.
- p SMITH, W. P. C.  
Hormone weedicide injury to grape vines.  
*J. Agric. W. Aust.*, 1952, 1 (n.s.): 502-3, illus.  
Symptoms of 2,4-D and 2,4,5-T injury illustrated.

## VEGETABLES, TEMPERATE, TROPICAL AND GLASSHOUSE.

*General.*

(See also 1428, 1429, 1430, 1495, 1497, 1503o, 1569, 1581, 1794-1810, 1979w, 2374, 2401, 2404, 2406p.)

1829. DRUZIN, V. V.  
Vegetable growing in the valley of the river Kamčatka. [Russian.]  
*Sad i Ogorod*, 1952, No. 10, pp. 50-2.

The climate of the Kamčatka peninsula is very severe, with only 40-50 frost free days a year. In the valley of the river Kamčatka a humus layer up to 22 cm. deep is found, the pH of the meadow soil lying between 4.14 and 6. Vegetable growing, restricted in the past to rootcrops and cabbage, has progressed during the past years, and now includes onions, tomatoes and cucumbers, the outdoor cultivation of which is described with recommendations for suitable varieties.

1830. TULŽENKOVA, F. F.  
Vegetable growing in the Arctic. [Russian.]  
*Sad i Ogorod*, 1952, No. 11, pp. 47-50, illus.

Apart from low temperatures the very short growing season (70-75 days) is the limiting factor for vegetable cultivation in the Arctic. The crops grown under glass or in the open are cucumbers, tomatoes, Chinese cabbage, radishes, lettuce, fennel, sorrel and some others. The construction of greenhouses and frames heated by hot water, steam or electricity is briefly described. For glasshouse cultivation, the cucumber varieties Klinskiĭ and Leningradskiĭ teplīčnyi were found the best. The seed is sown in pots on 10-15 March. In the seedling stage they are given 6-8 hours artificial illumination per day, transplanted into their permanent position early in May, artificially pollinated and given 6 to 8 liquid manure and mineral fertilizer side dress-



sings. The first cucumbers are picked at the end of May to early June; yields per sq. m. are 10-16 kg. Of the tomato varieties Bizon and Lučšii iz vseh [Best of All] are most suitable for Arctic conditions; they produce 3-4 kg. fruit per sq. m. Radishes can be grown in or out of doors, and Chinese cabbage, requiring only 50-60 days for growth, in the open, yielding 6-8 kg. per sq. m.

1831. PHILIPP, F.

Gartenbaureferat. (Horticultural report.)  
*Bodenkultur*, 1951, 2. Sonderheft, being  
*Jb. Bundesanst. Pflb. Wien*, 1950, pp. 239-73,  
illus.

A detailed report of vegetable variety trials carried out in 1950 at the experiment stations Neusiedl am See and Zinsenhof. Some cyclamen varieties were tested at Schönbrunn. For particulars of the Austrian variety register see *H.A.*, 21: 511 and 513.

1832. EWAN, J. W.

The glasshouse industry of the Blackpool area.  
*J. roy. agric. Soc.*, 1952, 113: 19-25, illus.

There are 435 glasshouse holdings with 113 acres of glass in the Blackpool district, Lancashire, of which 97 acres are heated. The houses generally carry three crops per year: lettuce, tomato, and chrysanthemum. Growers generally find a 7×7 in. spacing of lettuce more profitable than the 9×9 in. spacing customary in the South of England.

1833. VAN DEN ENDE, J.

De invloed van zout gietwater op de ontwikkeling van verschillende gewassen onder glas. (The effect of applying saline water on the behaviour of crops under glass.)  
*Meded. Dir. Tuinb.*, 1952, 15: 884-903,  
bibl. 8, illus.

The reaction of various glasshouse crops to salt water was investigated in pots. The technique used is described. Beans showed the greatest reaction, the reduction in yield being very pronounced even with very low concentrations of salt. Tomatoes and cauliflowers were much less susceptible, but grapes were rather sensitive. In contrast to other flower crops carnations showed only a weak reaction. It was found that the chlorine content of the soil mixture should not be greater than one corresponding to approximately 0.025% of kitchen salt.

1834. PROTASOVA, N. N.

Raising seedlings in the greenhouse under varying light conditions. [Russian.]  
*Sad i Ogorod*, 1952, No. 12, pp. 49-54, illus.

In the trials described, 8-10 hours artificial illumination with a total light period of 12-16 hours per day produced vigorous seedlings, coming into bearing 12-20 days earlier and giving higher total yields and, particularly, higher early season yields than the control plants. Best results were obtained with cucumbers sown on 15-20 December and with tomatoes on 25 December-5 January. Optimum temperatures for cucumbers were 23-25° C. during light periods, and 18-20° C. during darkness. The corresponding figures for tomatoes were 20-22° C. and 12-14° C. increased to 18-20° C. after the first 3 weeks. Fertilization with carbon dioxide, by

the release of gas, bringing the CO<sub>2</sub> content of the greenhouse air up to 0.2-0.3%, is considered very important for the earliness and general development of artificially illuminated plants. For the illumination of cucumbers, a combination of mercury and glow lamps, and luminescent lamps with white or blue light, were found the most suitable; for tomatoes a combination of mercury and neon lamps and luminescent lamps with red or white light. Movable lamps were better than fixed ones. Of the cucumber varieties Klinskii gave the best results under artificial illumination, while of the tomatoes a number of early varieties, including Bizon, were found suitable.

1835. KNOPPIEN, P.

Resultaten van bemestingsproeven op rivierklei bij enkele groenteteeltgewassen in de volle grond. (Results of manurial experiments on some outdoor vegetable crops on river-clay soil.) [English summary  $\frac{2}{3}$  p.]  
*Meded. Dir. Tuinb.*, 1952, 15: 625-38,  
bibl. 3.

In experiments on light clay soil with a high pH at Vleuten Experimental Gardens, Holland, it was shown that any disturbance in the equilibrium of plant nutrients tends to increase whiptail in cauliflowers. Applications of P and K reduced whiptail when N was simultaneously applied, but increased it when N was not applied. Na with K reduced whiptail, Na without K increased it. With broad beans Na had an adverse effect, while with spinach and red beet it had a beneficial effect, irrespective of K applications. With late endive Mg deficiency was accentuated by applications of K and Na; it was reduced by applications of magnesium sulphate and by keeping the soil moist. On this soil endive responded well to applications of P, even though there was a high level of P in the soil. On the results of these and other trials on similar soils, a table has been drawn up indicating the reaction of 10 vegetable crops and strawberries to N, P, K, Mg, Na and Cl.

1836. HARMER, P. M.

The nutrition of muck crops.  
*Bett. Crops*, 1952, 36 (8): 6-11, 40-3, and  
36 (9): 6-12, 40-1, illus.

Apart from P and K it is considered necessary, under certain circumstances, to apply N to muck or organic soils. Fertilizer recommendations for crops, mainly vegetables, grown in acid and alkaline muck soils are made, and responses shown to minor element applications are discussed.

1837. EVANS, H. J.

Sources of nitrogen in crop production.  
Sources of nitrogen for vegetable crops.  
*Tech. Bull. N.C. agric. Exp. Stat.* 96, 1952,  
pp. 43-53, bibl. 9.

The results of a number of experiments, briefly reviewed, suggest that: (1) where N alone is the limiting factor no one N fertilizer or mixture on acid soils is definitely superior to others; (2) Na nitrate may be superior to Ca or ammonium nitrate for certain vegetables (spinach, celery, swiss chard) on K-deficient soils, but when adequate K is supplied no difference between the various sources is encountered; (3) there is in general some advantage in supplying N from mixed sources.

## 1838. (MINISTER OF AGRICULTURE, CANADA.)

## Insect and fungal pests of vegetables.

A.R. Canada Minist. Agric. 1951-52, 1952, pp. 29-30.

**Root maggots:** Seed treatment with DDT and other chlorinated hydrocarbon insecticides gave excellent control of the onion maggot in British Columbia. **Black rot of carrots:** *Stemphylium radicum* may overwinter in the field debris of several crop plants. Six fungicides were tested by applying 6 sprays to plants grown from infected seed; rates of freedom from petiolar and root infection at harvest were: manzate 47%, neutro-cop "53" 33%, thiram slurry 23%, ferbam 22%, dithane Z-78 22%, K permanganate 11%, control 9%. **Melon wilt:** Isolates from musk-melon were found capable of attacking watermelon seedlings and *vice versa*. Seed treatment with thiram prevented pre-emergence rot but not early post-emergence wilt. **Verticillium wilt of tomato:** In British Columbia the following plants may be naturally infected: tomato, potato, pepper, eggplant, cantaloupe, watermelon, squash, apricot, nightshade, cockle-bur and lamb's quarters.

## 1839. STRAWIŃSKI, K.

Owady przenoszące wirusy roślin spotykane na terenie województwa lubelskiego. (Insect vectors of plant virus diseases found in Lublin province.) [English and Russian summaries 1 p. each.] *Ann. Univ. Mariae Curie-Skłodowska, Sect. E*, 1950, 5: 251-75, bibl. 49, illus. [received 1952].

Lists are given of important and doubtful virus vectors and of crop plants including vegetables, tobacco and hops attacked by viruses with the names of insects transmitting specific diseases.

## 1840. FLENTJE, N. T.

*Corticium praticola* Kotila; an interesting basidiomycete occurring in England.

*Nature*, 1952, 170: 892, bibl. 2.

The fungus was obtained from four widely separated localities in England. In two places the soil was heavily infested with the organism and in two others it was found causing foot rot of cucumber and rot of dahlia petioles and leaves respectively. *C. praticola* is pathogenic to sugar beet seedlings above 15° C. and to a wide variety of hosts, including lettuce, tomato, cabbage and dahlia, at and above 23-25° C. This fact, together with its vigorous saprophytic growth, makes the fungus a potential danger if it becomes established in vegetable-growing areas. In South Australia it has caused severe loss of tomato seedlings raised under warm conditions.

## 1841. PETERS, B. G.

## Control of plant nematodes.

A.R. Progr. appl. Chem. for 1951, 1952, 36: 701-4, bibl. 23.

A review of recent literature on ethylene dibromide and some new materials and methods. Eelworms damaging horticultural plants are included in the discussion.

## 1842. SPEYER, E. R., AND PARR, W. J.

Red spider mite (*Tetranychus telarius* L.).

A.R. Cheshunt exp. Res. Stat. 1951, 1952, pp. 41-9, bibl. 1.

Records of observations on the longevity and reproductive capacity of the adult forms of *Tetranychus telarius* under varying environmental conditions.

## 1843. CHESHUNT.

## Some effects upon red spider-mite of bis-dimethylamino phosphonous anhydride.

A.R. Cheshunt exp. Res. Stat. 1951, 1952, pp. 49-51.

Mites kept upon tomato leaflets or portions of them which had absorbed anhydride from a 0.1% solution either in water or in nutrient solution remained alive for much shorter periods of time and were consequently able to deposit far fewer eggs than mites kept upon similar objects floated upon water or nutrient solution. The viability of eggs laid by the mite upon leaflets which had absorbed the anhydride, or upon a cork surface to which it had been applied, was not impaired, nor was the period of their incubation affected. [From author's summary.]

## 1844. CHESHUNT.

## Red spider mite control in glasshouses.

A.R. Cheshunt exp. Res. Stat. 1951, 1952, p. 55.

The acaricidal action of 4-chlorophenyl benzene-sulphonate (PCPBS) and its phytotoxicity to cucumbers and tomatoes were studied in preliminary experiments.

## 1845. WENE, G. P.

## The false chinch bug.

Proc. 7th Annu. Rio Grande Valley hort. Inst., 1953, pp. 74-6.

The false chinch bug, *Nysius raphanus* Howard, was found in destructive numbers on lettuce, mustard greens, and turnips during February and March of 1952. Control was obtained with aeroplane applications of 2.5% aldrin, 3% gamma benzene hexachloride, and 2-10-40 (2% gamma BHC, 10% DDT, and 40% sulphur). [Author's summary.]

## 1846. SMITH, F. F., FULTON, R. A., AND EDWARDS, F. I.

## New insecticides for greenhouse vegetables.

A.R. Veg. Gr. Ass. Amer., Inc., 1951, 1952, pp. 21-8, bibl. 6.

Advice is given on the control of 21 common pests of greenhouse vegetables with TEPP, sulfotepp, parathion, DDT and lindane.

## 1847. DOWDY, A. C., AND SLEESMAN, J. P.

## Systemic poisons on vegetable crops.

J. econ. Ent., 1952, 45: 640-3, bibl. 6.

In field trials conducted at the Ohio Agricultural Experiment Station both Schradan and Systox, applied as foliage sprays, gave good control of two-spotted mite, *Tetranychus bimaculatus* and all aphid species found on turnips and egg plants, i.e. *Rhopalosiphum pseudobrassicae*, *Myzus persicae* and *Illinoia solanifolii*. Residual action of both systemics depended on the amount of active ingredient applied. Residue analyses of vegetable samples have shown conflicting results and no general comparisons could be made between Schradan and Systox.

## 1848. SMITH, F. F., AND OTHERS.

## Residues of organic phosphorus compounds and DDT on greenhouse vegetables.

J. econ. Ent., 1952, 45: 703-7, bibl. 13.



Residues found on Globe tomatoes, White Spine cucumbers and Grand Rapids lettuce from aerosol and soil applications of parathion and aerosols of sulphotepp and DDT are given. It is shown that parathion was not translocated from treated foliage to bagged tomato fruits or from treated soil to fruits.—Bur. Ent. and Plant Quar., Beltsville, Md.

1849. OGATA, K., AND IMAYUKI, T.

Studies on the storage of perishable agricultural products. V. Studies on the respiration of some vegetables after harvesting. [Japanese with English summary  $\frac{3}{4}$  p.]

*Tech. Bull. Kagawa agric. Coll.*, 1952, 3: 158-65, bibl. 20.

The vegetables and fruit studied were *Brassica chinensis*, spinach, lettuce, cabbage, eggplant, cucumber, tomato, strawberry, beans, onion and carrot. Measurements were made of the respiratory rate immediately after harvesting and during storage at 25° C., of the heat generated, and of the amount of glucose consumed. The respiratory rate on harvesting was greatest in leaf vegetables and beans, intermediate in the "fruit vegetables", and least in the roots, which were quiescent. With leaf vegetable samples of equal weight the greater the surface area, the greater was the emission of carbon dioxide. In most vegetables the respiratory rate decreased rapidly during the first day after harvesting and gradually thereafter, but the rate of decrease differed markedly in different vegetables. The respiratory rate was in general much affected by humidity; it was greater with higher humidity in eggplant and less in spinach. Wrapping with paper greatly retarded the rate of respiration. In certain vegetables the rate varied with degree of ripeness.

1850. FRIEDMAN, B. A.

Vacuum cooling of vegetables and fruits.

*A.R. Veg. Gr. Ass. Amer., Inc.*, 1951, 1952, pp. 98-104, bibl. 9.

Within the last few years vacuum precooling has been developed commercially for the rapid treatment of lettuce and some prepackaged vegetables. The rapid vaporization of the water from the produce caused by the vacuum lowers the temperature of the produce relatively quickly. Various leafy vegetables with a large surface-area/volume ratio can be readily vacuum precooled. Experimental evidence suggests that it may be possible to treat asparagus, sweet corn, leeks, cabbage, sprouts and mushrooms, but tomatoes, cucumbers, carrots, bell peppers, string beans and oranges cannot at present be adequately precooled.

1851. SMITH, W. H.

Cold storage of vegetables.

*Grower*, 1952, 38: 1146.

Broccoli store well at 32° F. in air for 3 weeks and in 10% CO<sub>2</sub> plus 11% O<sub>2</sub> for 5 weeks. Sound celery will keep for 8-10 weeks in air at 33° F., but gas storage has not so far proved suitable.—D.S.I.R.

### *Asparagus.*

1852. THOMAS, P. H.

Asparagus culture.

*Tasm. J. Agric.*, 1952, 23: 268-75, illus.

The rust-resistant variety, Mary Washington 499, is particularly recommended for Tasmania.

### *Brassicas.*

(See also 1436, 1437, 1920, 1923, 1979k, m.)

1853. ABBISS, H. W.

Broccoli production and marketing in the St. Malo area.

*Comm. Grower\**, 1952, No. 2974, pp. 1203-4.

Some of the cultivation practices observed in northern France are compared with those used in Cornwall, and the 2 main marketing methods, i.e. for home or continental markets and for export, are briefly described.

1854. MOORE, J. F., AND ALLMENDINGER, D. F.

Variety and cultural studies with green sprouting broccoli in Western Washington.

*Bull. Wash. St. agric. Exp. Stats* 539, 1952, pp. 14, bibl. 9.

In Western Washington the broccoli crop, grown mainly for processing by freezing, is summer-transplanted, using 6- or 7-week-old plants of the Medium strain, and is harvested in August-November. Varietal, date of transplanting, spacing and pruning trials were conducted in 1949-51. It was found that (1) Waltham 29, Medium, Medium (Advanced), Waltham 11, K and V were good varieties; (2) the optimum planting date was from 20 June to 5 July depending on variety; the best spacing for Medium strains was 3 ft. 6 in.  $\times$  1 ft. 6 in. and for Waltham 29 3 or 3 ft. 6 in.  $\times$  1 ft.; pruning out the centre head reduced yield and was undesirable unless necessary to maintain shoot size.

1855. ZAURALOV, O. A.

Changes in the physiological processes occurring in the leaves of cabbages affected by shading. [Russian.]

*Doklady Akad. Nauk S.S.S.R.*, 1952, 84: 615-17, bibl. 10.

Experiments were carried out with two varieties of cabbage, one a southern heat-resistant form, the other a northern form not resistant to heat, the tested plants being shaded with muslin, the controls not shaded. Results are tabulated for determinations made four times daily with reference to water content, water loss (compared with the early morning water content), percentage of stomata open, and air temperatures under shade and in the open. Determinations were made three times daily of the nitrogen content (protein and non-protein) and sugars (monosaccharides and disaccharides). From the results obtained it is concluded that shading accelerated the metabolic processes in the plants and so improved their physiological condition, resulting in better yields.

1856. WALKER, P.

Wind causes buttoning in cauliflowers.

*Grower*, 1953, 39: 35-7.

A case is described in which 14 cauliflower stocks planted out on 24 March were subjected to a blizzard on 29 March. Plants that had been protected by a hessian windbreak 6 ft. high developed normally, whereas unprotected plants were stunted and showed a general tendency to premature heading. Reference is also made to 3 stocks of one variety, one of which

\* Formerly *Fruitgrower*.

produced a high proportion of whiptail plants while the others remained free. It is suggested that the seed of the affected stock may have come from a crop grown in Mo deficient soil.

## 1857. BROADBENT, L.

**Barrier crops may help to reduce cauliflower mosaic.**

*Grower*, 1952, 38: 1140-1, illus.

Work on this serious disease in the U.K. is in progress at Rothamsted, Seale-Hayne and various N.A.A.S. centres. Twenty-two out of 27 aphid species were found to transmit the virus, the most important being *Myzus persicae* and *Brevicoryne brassicae*. In preliminary trials, surrounding seedbeds with narrow strips of other crops, particularly cereals, and with screens of netting and sisalkraft has given a promising measure of protection.

## 1858. VAN HOOF, H. A.

**Stip in kool, een virusziekte. ("Stip" (specks) in cabbage, a virus disease.)**

[English summary  $\frac{1}{2}$  p.]

*Meded. Dir. Tuinb.*, 1952, 15: 727-42, bibl. 10, illus.

"Stip" is a virus necrosis of winter cabbages that causes serious damage in some districts of Holland. Differences in susceptibility are shown by different selections. The most important vector is thought to be the cabbage aphid, *Brevicoryne brassicae*, and there are indications that transmission takes place during July. To reduce the risk of infection, seedbeds should not be made in the neighbourhood of seed cabbage, which might be infected from the previous year, and seed cabbage should be well rogued and sprayed to eradicate the vectors. Old cabbage stumps left in the field should not be allowed to sprout. Resistant strains should be grown.

## 1859. BAIN, D. C.

**Reaction of brassica seedlings to blackrot.**

*Phytopathology*, 1952, 42: 497-500, bibl. 7.

The reaction of brassica seedlings to blackrot (*Xanthomonas campestris*) was determined from the percentage of diseased plants from inoculated seeds. Turnips and mustards were in the low group (less than 33%) and cauliflower, broccoli and brussels sprouts in the high group (more than 55%), while cabbage was intermediate (41%). Selfed selections from surviving healthy seedlings of cabbage showed a marked reduction in percentage of diseased seedlings as compared with controls from commercial seed. The possibility of selection for resistance to blackrot is discussed.

## 1860. WENE, G. P., AND WHITE, A. N.

**New insecticides for cabbage aphid control.**

*Proc. 7th Annu. Rio Grande Valley hort.*

*Inst.*, 1953, pp. 70-3, bibl. 2.

Materials found to give satisfactory control of *Brevicoryne brassicae* included 1% parathion, 1.5% methyl parathion, 3%  $\gamma$ -BHC, 2.5% and 5% malathion dusts, systox and metacide as high volume sprays, and EPN at 0.5 lb./100 gal., lindane at 0.25 lb./100 gal., malathion at 0.32 lb./100 gal. and NPD at 0.5 lb./100 gal. [See also *H.A.*, 22: 3798.]

## 1861. DOSSE, G.

**Der Grosse Kohltriebrüssler *Ceutorrhynchus napi* (Gyll.): Biologie, Schadaufreten und Bekämpfung unter besonderer Berücksichtigung der "Gallbildung" an Kohlpflanzen. (The large cabbage shoot weevil: biology, occurrence as a pest and its control, with special reference to "gall formation" on cabbage.)**

*Z. angew. Ent.*, 1951, 32: 489-566, bibl. 65, illus., from abstr. in *Rev. appl. Ent.*, 1952, 40: 323-4.

*Ceutorrhynchus napi* is widely distributed in southern and south-western Germany and causes serious injury to cabbage among other crops. Experiments on control of overwintered adults with E605 Staub [a dust of 2% methyl-parathion] and E605 forte [a spray concentrate of 50% parathion and 50% emulsifier] gave satisfactory results and produced appreciable yield increases in rape and turnip rape.

## 1862. MORETON, B. D., AND LIGHT, W. I. St. G.

**Control of cabbage root fly with BHC and tar oil wash.**

*Plant Path.*, 1952, 1: 121.

In a trial in Kent in 1950, BHC (50% w.p.) applied to the soil around the roots of cabbage plants at rates of 1 or 2 oz. per 5 gal. (1 fl. oz. per plant) gave very good control of cabbage root fly, *Erioischia brassicae*. The yield from treated plots was about double that obtained from untreated. Tar oil wash applied at 1 pt. in 6½ gal. gave a statistically significant but commercially inadequate control. BHC was also found satisfactory on a commercial plot. The cost of the BHC treatment at the lower rate was approximately 4s. per acre for materials, as against nearly £4 for the calomel dust, usually applied against cabbage root flies.

## 1863. BONNEMAISON, L., AND MISSONNIER, J.

**Essais de traitements contre les mouches du chou. (Experiments on the control of cabbage root fly.)**

*C.R. Acad. Agric. Fr.*, 1952, 38\*: 581-3.

Various chemicals and methods were tested for the control of cabbage root flies (*Chortophila brassicae* and *C. floralis*) in 1951 and 1952. Concentrations and dosages are specified, phytotoxic effects are noted and the percentage of healthy plants is tabulated for the following treatments: (1) Dipping the roots into a suspension of the insecticide, (2) application of the liquid after planting and (3) a combination of (1) and (2). In the Paris and Mans regions, where the experiments were carried out, the dipping of the roots into suspensions of lindane, BHC or one of its derivatives, chlordane or parathion gave 100% control. In cases of very severe infestation another application of these chemicals soon after planting (1 g. dust or 100 c.c. liquid per plant) is recommended.—Station Centrale de Zoologie Agricole.

## 1864. McEWEN, F. L., AND CHAPMAN, R. K.

**Imported cabbageworm resistance to insecticides.**

*J. econ. Ent.*, 1952, 45: 717-22, bibl. 16.

Data are presented showing that the imported cabbageworm, *Pieris rapae*, has acquired field resistance to DDT

\* Printed as Vol. 39 in error.



and Q-137 (1,1-dichloro-2,2-bis(*p*-ethyl phenyl) ethane) and exhibited some tolerance to TDE and methoxychlor in a limited area in south-eastern Wisconsin. Control with parathion was somewhat erratic within the area where resistance had developed, but in general parathion, metacide and malathion gave satisfactory results. CS-708 gave excellent control of both DDT-resistant and susceptible larvae and 269, a dimethanonaphthalene compound, in limited tests was found satisfactory for the control of resistant cabbageworms.

1865. MATTHEWMAN, W. G., HARCOURT, D. G., AND PERRON, J. P.  
Timing of DDT applications for control of caterpillars on cabbage.  
*Canad. Ent.*, 1952, **84**: 346-52, bibl. 5, being *Contr. Div. Ent. Sci. Serv. Dep. Agric. Ottawa* 2977.

The 3 species of caterpillar which commonly attack cabbage at Ottawa are the imported cabbage worm, *Pieris rapae*, the diamond-back moth, *Plutella maculipennis*, and the cabbage looper, *Trichoplusia ni*. On early cabbage they are controlled by 1 or 2 applications of rotenone in late June or July. On late cabbage, trials for 4 years have shown that almost complete control can be obtained in average years with 3% DDT dust applied on 20 July and 2, 15 and 30 August. In years when the population of the imported cabbage worm falls off rapidly in late August 3 applications beginning on 20 July may suffice.

1866. VERBRUGGEN, A.  
Het bewaren van kabuiskolen. (The storage of headed cabbage.)  
*Cult. Hand.*, 1952, **18**: 636-7.

Only certain varieties of headed cabbage are suitable for storage, Langendijker Red and Danish White being the best. The cabbage should be harvested dry during the early afternoon, and cut with a piece of stem 5 cm. long. The most suitable storage place is a specially insulated and ventilated shed, but it is possible to use lofts, cellars or even pits. The optimum temperature is 1° C. but the cabbage should never be exposed to frost. The heaps, which should not be more than 1.4 m. high, should be gone through every few weeks and any rotting heads discarded.

### Celery.

1867. MINGES, P. A., AND OTHERS.  
Brown checking of celery.  
*Calif. Agric.*, 1952, **6** (12): 5-6, illus.

The symptoms of this disorder, which is also known as "scratch" or "cracked stem", are described and illustrated. Studies indicate that the use of relatively resistant varieties is probably the best method of control. There is some evidence that the disorder may be associated with a high K: B ratio, of 3,000: 1 or higher, in the plant. Soil or spray applications of B have reduced the trouble in some instances, but not in others. Reduced K applications might also prove helpful.

1868. MIDDLETON, J. T., AND OTHERS.  
Adaxial crack stem of celery.  
*Phytopathology*, 1952, **42**: 603-6.

A serious boron deficiency disorder of Utah type celery (particularly Utah 10B) affecting the adaxial surface of

petioles and petiolules has been observed in coastal California since 1945, especially when the crop is grown under extremely high nitrogen conditions. Diseased tissue first appears water soaked, later turns dark and becomes necrotic and eventually shows corky transverse checks and cracks. The disease typically develops without abaxial cracks but both types of cracking may develop on some plants. The disease may be controlled by applying water sprays of borax, 2 oz. to the gal.—Univ. Calif.

1869. VAUGHAN, E. K.  
Control of celery late blight.  
From abstr. in *Phytopathology*, 1952, **42**: 519.

Spray and dust trials have shown that losses from celery late blight (*Septoria apii*) can be almost entirely prevented by timely application of fungicides. Ziram (1½ lb./100 gal. or 10% dust) and tribasic copper sulphate (6 lb./100 gal.) have given best control without evidence of phytotoxicity. During the dry season dusts and sprays applied at 14-day intervals have given comparable control. After the beginning of the autumn rains only spraying gives satisfactory control and the interval between applications must be shortened to 7 to 10 days.

### Cucurbits.

(See also 1979a, q, u.)

1870. KASAHARA, Y., AND AKITA, S.  
The abnormality in the germination of squash, *Cucurbita moschata* Duch. caused by light.  
*Ber. Öhara Inst. landw. Forsch.*, 1951, **9**: 451-3, illus.

Squash seeds germinated in light at 20° C. were found to produce 20-30% abnormal seedlings, while no abnormal seedlings were produced in seed germinated in the dark at 20° C. or in light at 23-24° C. Apparently, seedling development is normal when the rate of germination is not checked. The authors recommend that squash seed should be covered with a thick layer of soil to exclude light if the soil temperature does not reach 23° C. The abnormalities, for which no physiological explanation could be given, are described and illustrated.

1871. AGATI, G.  
Osservazioni sulla biologia florale del cetriolo. (Observations on the floral biology of the cucumber.) [English summary 8 lines.]  
*Riv. Ortoflorofruttic. ital.*, 1952, **36**: 251-62, bibl. 41, illus.

The species is mainly heterogamous, pollination being effected mainly by bees. The frequent degeneration of varieties is due to crossing. To obtain pure seed mono varietal culture is necessary.—Arbicultural Institute, Florence.

1872. CHESHUNT.  
Cucumbers; experimental results of 1951.  
*A.R. Cheshunt exp. Res. Stat.* 1951, 1952, pp. 18-21.

Steam sterilization followed by soil injection with DD gave complete control of *Heterodera marioni*. A solid

brick base underneath the beds stopped the roots from growing downwards and increased yields from 69 to 75.5 tons per acre. The standard practice of spacing the plants 2 ft. apart and of growing them with one main stem proved superior to other practices.

1873. CAPINPIN, J. M., AND NATIVIDAD, N. M.  
The influence of 2,4-D sprays on melons and watermelons with special reference to seediness and weight of the fruits.

*Philipp. Agric.*, 1951, 35: 260-5, bibl. 9.

*Melon*. None of the concentrations used (15, 20 and 25 p.p.m.) increased fruit set or the weight of the fruits, but all reduced the seediness of the fruit and the viability of the seed. 25 p.p.m. was the best for reducing the number of seeds (456 compared with 691 in the control). *Watermelon*. Fruits from treated plants were lighter than those from untreated plants. 25 p.p.m. was most effective in reducing the period between blossoming and maturity of melon and watermelon.—Los Baños, Coll. of Agric.

1874. TJALLINGH, F.

Onderzoekingen over de mozaïkziekte van de augurk (*Cucumis sativus* L.). (Investigations on the mosaic disease of gherkin (*Cucumis sativus* L.) [English summary 4½ pp.]

*Meded. Inst. PlZiekt. Onderz. Wageningen* 47, [1952?], pp. 124, bibl. 167, illus., Fl. 3.50.

It has been shown that the wilting and dying off of gherkins, that cause considerable losses in the Netherlands, are symptoms of the mosaic disease caused by *Cucumis virus* 1. A comprehensive review of the literature on the disease is followed by a report of extensive laboratory and field investigations in Holland. The following are among the findings reported. Disease symptoms are seldom found before the end of June and the spread of infection ceases after the end of August, dates which are correlated with the activity of the aphid populations. Transmission of the virus was obtained with 4 species of aphid, the most important vector probably being *Myzus persicae*. Infection through the soil, seed or handling is unlikely. In North Limburg symptoms always appear first in the low, marshy areas, which are considered as primary disease centres. It is suggested that the virus overwinters in perennial marsh plants that grow in these areas and are only visited by the aphids in summer. *Scrophularia* and *Valeriana officinalis* are considered as important potential winter hosts of the virus. A relationship was established between the wilting symptom and temperature. No variety of *Cucumis sativus* shows true resistance to mosaic, but the German variety Delikatess is slightly less sensitive than the Dutch selections, and the Japanese variety Tokyo Long Green is highly tolerant. Breeding from this latter variety is suggested. The only other suggested line of control is determining and eradicating the winter hosts of the virus.

1875. McKEEN, C. D.

Observations on the occurrence and control of grey mould on greenhouse cucumbers.

*Sci. Agric.*, 1952, 32: 670-6, bibl. 15, illus., being *Contr. Div. Bot. Plant Path., Sci. Serv. Ottawa* 1186.

In recent years stem canker and fruit rot, caused by *Botrytis cinerea*, has been prevalent and destructive in many greenhouse cucumber crops in south-western Ontario. Moribund plant organs, including not only blossoms but also tendrils, petioles, lateral branches and fruit pedicels, have been found to serve as infection courts for the fungus prior to its invasion of healthy tissues. When established in a greenhouse, the disease has been observed to spread rapidly. In the presence of high greenhouse humidity combined with a soft vegetative growth, lesions originating at the nodes rapidly girdled the stems and killed the plants. The application of Fermate sprays when the crop reached the susceptible stage was found to reduce substantially the percentage of infections. Effective control of stem lesions was obtained by covering the diseased areas with a thin paste of Fermate. Stem treatments and periodic sprays with Fermate were found to be non-injurious to the cucumber crop. [Author's summary.]

1876. ATKINS, J. G., JR., AND HORN, N. L.

A simple greenhouse method for evaluating fungicides for control of cucumber anthracnose.

*Plant Dis. Repr.*, 1952, 36: 270-2, bibl. 5, illus.

The technique used is described. The fungicides tested against *Colletotrichum lagenarium* are listed according to their relative effectiveness.

1877. READ, W. H.

Preliminary investigations of fungicides for the control of cucumber mildew.

*A.R. Cheshunt exp. Res. Stat.* 1951, 1952, pp. 30-2.

Copper-petroleum emulsion sprays give effective control of cucumber mildew, *Erysiphe cichoracearum*, but they have become expensive since alternative acaricides have replaced the use of petroleum for red spider control. The most outstanding fungicide tested in these trials was 2:3-dichloro-1:4-naphthaquinone, but further experiments are necessary to determine its phytotoxicity to cucumber.

### Legumes.

(See also 1454, 1458, 1489, 1492, 1979 1.)

1878. VAN DER VAART, F. M.

The identification of pea varieties in the seedling stage. [Dutch summary ¼ p.]

*Euphytica*, 1952, 1: 29-33, bibl. 1, illus.

The first two scale leaves formed by pea seedlings are very useful for identification. Methods of investigation are described, and the forms, occurring in 14 agricultural varieties grown in the Netherlands, are discussed. [Author's summary.]—Govt. Inst. Res. Var. Field Crops, Wageningen.

1879. CRUCHET, P.

Distances à observer dans les cultures de haricots porte-graines. (Spacing necessary for seed crops of haricot beans.)

*Rev. hort. suisse*, 1953, 56: 46-7.

Bumble bees were observed to find their way into not fully opened bean flowers. To avoid hybridization,



varieties grown for seed should be planted 100 m. apart, instead of the customary 4 m.—Lausanne.

1880. HARTMAIR, V., AND LEITENBERGER, L.  
Untersuchungen über den Saccharosegehalt von Pflückerbsen und dessen Abhängigkeit von äusseren und inneren Faktoren. (Investigations on the saccharose content of green peas and its relation to external and internal factors.)  
*Züchter*, 1951, 21: 292-301, bibl. 2 [received 1953].

Saccharose and dry matter contents of 4 pea varieties were determined for 3 years in relation to variety, seed size, time of sowing, locality and climate. The response to several of these factors was shown to be characteristic of the variety. The main practical conclusions emerging from the mass of data obtained at altitudes above 1,000 m. are (1) that shelling peas must be sown early if a deterioration in quality is to be avoided; (2) that early marrowfat varieties of medium height (Duplex) do very well at high altitudes; (3) that shelling peas have to be picked early, whereas marrowfat peas can be left until the seed has reached its full size. In the case of shelling peas the determination of dry matter and water content proved a good indicator of the best time for harvesting. Breeding should aim at the development of very early shelling pea varieties and of cold-resistant, high-yielding marrowfat varieties with a high sugar content.—Bundesanst. f. alpine Landw., Admont, Austria.

1881. LEUTSKÏ, K. M., AND STULNIKOVA, R. I.  
Nicotinic acid and tryptophane content of bean seeds during germination and ripening. [Russian.]  
*Doklady Akad. Nauk S.S.S.R.*, 1951, 80: 919-20, bibl. 3 [received Dec. 1952].

The nicotinic acid content of the seed of the bean variety Šedraja [Bountiful] during 8 days germination increased from 1.85 mg./% to 46.97 mg./%, and the tryptophane content decreased from 3.08 mg./% to 1.22 mg./%. In ripening seed, a reduction of nicotinic acid from 31.9 mg./% in the green ripe to 6.4 mg./% in full ripe stage took place, while the tryptophane content increased slightly from 2.32 to 2.44 mg./%.

1882. SCHNEIDER, A.  
Untersuchungen über die Eignung von Erbsensorten für Zwecke der Nasskonservierung. II. Qualitative Unterschiede von Schal- und Markerbsestärke und ihre Einflüsse auf die Aufgussflüssigkeit der Nasskonserven. (Investigations on the suitability of pea varieties for canning and bottling. II. Qualitative differences in the starch of shelling and marrowfat peas and their effects upon the liquid added in processing.)  
*Züchter*, 1951, 21: 275-81, bibl. 10, illus. [received 1953].

In continuation of earlier biochemical studies [see H.A., 22: 2585] the morphological and structural differences in the starch granules of shelling and marrowfat peas were studied in relation to the chemical and metabolic differences that occur in the two groups of peas.—Inst. f. Pflanzenzüchtung, Quedlinburg.

1883. KARWOWSKA, T.  
Zawartość "wiókna" w fasoli szparagowej w zależności od wieku strąka i odmiany. (The stringiness of runner beans in relation to age of pod and variety.) [English summary  $\frac{1}{2}$  p.; Russian summary 1 p.]  
*Rozn. Nauk Roln.*, 1950, 54: 315-34, bibl. 7 [received Dec. 1952].

The fibre content of pods from 63 bean varieties, determined at the stage when the seed had reached about one-half its full size, was found to vary between 0.01 and 1.58% of the dry weight, the highest fibre content of a stringless variety being 0.08%. On the average, the pods of 9 varieties examined contained 54% of the total fibre in the sutures and 46% in the walls.

1884. CHROBOCZEK, E., AND RIEFF, J.  
Wpływ gęstości siewu na rozwój i plon fasoli Bomby, Noridy i Perłówki. (The effect of rate of sowing on the development and yield of the bean varieties Bomba, Norid and Perlowka.) [English summary 2 pp.]  
*Rozn. Nauk Roln.*, 1950, 54: 335-60, bibl. 15 [received Dec. 1952].

Three years' trials showed that machine drilling of bean seed may produce higher yields of dry seed than hill planting, a method frequently used in Poland.

1885. DELVER, P.  
Bemestingsproeven met stamslabonen. (Fertilizer experiments on dwarf beans.) [English summary  $\frac{1}{2}$  p.]  
*Meded. Dir. Tuinb.*, 1952, 15: 816-28, bibl. 5.

Pot experiments on the fertilizer requirements of dwarf beans were carried out over a period of 3 years at Sloten, Holland. The results showed that dwarf beans require considerable quantities of N and P but comparatively little K. Large quantities of N promote fruit set, but a small quantity of N in the form of nitrates resulted in poorer fruit set than no N. This is explained by the fact that N increases the number of flowers but at the same time reduces the rate of N production by nodule organisms, with the result that the flowers do not set. P also stimulates flower formation and fruit set. N only increases yield if an adequate supply of P is available, K increases yields slightly but does not affect fruit set. In field experiments on peat and sandy soils, the P requirements of the plants were lower than in the pot experiments. It is concluded that dwarf beans can absorb P from the soil irrespective of the solubility of the P compounds available.

1886. YAKAR, N.  
Mitotic disturbances caused by chloranil.  
*Amer. J. Bot.*, 1952, 39: 540-6, bibl. 19, illus.

A description is given of the deformative effects on *Vicia faba* seedlings of chloranil (tetra-chloro-*p*-benzoquinone), the active ingredient of a commercial fungicide. About 60% of the seedlings germinating from seeds that had been dusted with the fungicide were malformed, the plumules and radicles being shorter and thicker than in the normal seedlings.—Carnegie Institution, New York.

1887. LUTTRELL, E. S., AND GARREN, K. H.

**Blights of snap bean in Georgia.**

*Phytopathology*, 1952, **42**: 607-13, bibl. 10, illus.

Greenhouse and field studies were made of fungus diseases of the snap bean in Georgia on the variety Tendergreen. *Macrophomina phaseoli* causes ashy stem blight and macrophomina leaf spot which are primarily diseases of mature plants, and charcoal rot, a disease of young seedlings. *Rhizoctonia solani* induces stem canker and blight. Southern blight, caused by *Sclerotium rolfsii*, is characterized by light-coloured, shrunken lesions, girdling the stem at soil level and resulting in the wilting and death of the entire plant. Charcoal rot was completely controlled in greenhouse experiments by seed treatment with 2% cerasan. Beans are highly susceptible to *S. rolfsii* at all ages but become more resistant to *R. solani* with increasing age; field observations indicate that these diseases may be avoided by early planting.—Ga Exp. Stat.

1888. LOWINGS, P. H.

**A disease of peas.**

*Gdnrs' Chron.*, 1953, **133**: 40, bibl. 10, illus.

A note on the first recorded occurrence of *Ascochyta pinodella* causing a foot rot of peas in Ireland.

1889. SÖRGEL, G.

Über die Ursachen der unterschiedlichen Resistenz verschiedener Erbsensorten gegenüber den Fusskrankheitserregern *Ascochyta pisi* Lib., *Ascochyta pinodella* Jones und *Mycosphaerella pinodes* (Berk. et Blox.) Stone. I. Vergleichende Untersuchungen zum Verhalten der Pilze auf einer stark und einer schwach anfälligen Sorte. (On the causes of differences in resistance of pea varieties to the foot rot pathogens *Ascochyta pisi*, *A. pinodella* and *Mycosphaerella pinodes*. I. Comparative investigations on the behaviour of the fungi on a highly and on a slightly susceptible variety.) *Züchter*, 1952, **22**: 4-26, bibl. 13, illus.

The resistance to foot rot of the sugar pea variety, Graue Buntblühende, was shown to be based on the chemical composition of its testa which provides a protective layer against fungi. Extracts from the testas of this variety, as compared with extracts from the susceptible Kelvedon Wonder, had a clearly inhibiting action on mycelium growth and pycnidia formation which may be partly masked by differences in nutrient concentration in the testa. Under the influence of the fungistatic agent the hyphae became irreversibly deformed. *Mycosphaerella* was found to be the most and *Ascochyta pisi* the least susceptible of the foot rot fungi. The bearing of these findings on breeding for resistance are discussed.—Inst. f. Pflanzenzüchtung, Quedlinburg.

1890. SCHRÖDTER, H.

Über die Bedeutung des Mikroklimas für die Entwicklung parasitischer Pilze der Gattung *Ascochyta* (Erreger der Brennfleckenkrankheit der Erbse). (On the importance of microclimate in the development of parasitic fungi of the genus *Ascochyta* (agents of pea anthracnose).)

*Angew. Meteor.*, 1951, **1** (3): 79-85, from abstr. in *Rev. appl. Mycol.*, 1952, **31**: 587.

The rarity of severe outbreaks of anthracnose in the dry climate of central Germany is no doubt attributable to the exacting moisture requirements of *A. pinodella*.

1891. KAREL, G.

**Baklakarda botrytis leke hastalığı. (Broad bean spot disease caused by *Botrytis*.)**

*Bit. Kor. Bül.*, 1952, No. 2, pp. 16-22, illus., from abstr. in *Rev. appl. Mycol.*, 1952, **31**: 588.

Observations over a period of years in the Mediterranean provinces of Turkey have shown that *Botrytis fabae* may cause reductions in the broad bean crop of 60 to 100%. In the vicinity of Adana, the disease occurs in both a mild and an "aggressive" form.

1892. MILLER, H. J.

**Control of damping-off fungi with halogen substituted nitrobenzenes.**

From abstr. in *Phytopathology*, 1952, **42**: 470.

Pea seed treatment with 2,4-dinitrofluorobenzene at the rate of 0.25% by weight of seed of a 10% active powder, in greenhouse soil heavily infested with damping-off organisms, gave emergence equal to standard seed treatment chemicals. Untreated pea seed gave as low as 0% emergence in this soil under similar conditions.

1893. VAUGHAN, E. K., AND DANA, B. F.

**Studies on control of white mold of beans.**

From abstr. in *Phytopathology*, 1952, **42**: 477.

Incidence of white mould (*Sclerotinia sclerotiorum*) has been reduced in Blue Lake type beans in the Pacific Northwest by sprays and dusts. Ziram (3 lb./100 gal. and 7% dust) and Cop-O-Zink (6 lb./100 gal., and dust containing 6% metallic Cu) have consistently given best control, sprays being better than dusts. Improved aeration and more rapid drying of the plants each morning as a result of wider row spacing has also resulted in significant reduction in infection.

1894. JENKINS, C. F. H.

**The red-legged earth mite (*Halotydeus destructor* (Tucker)).**

*J. Agric. W. Aust.*, 1952, **1** (n.s.): 509-12, illus.

The red-legged mite attacks a number of crops including peas. Its life history and habits are outlined. Control measures include cultural methods, especially the prevention of weed growth, and the application of insecticides such as Black Leaf 40 and DDT.

1895. MILETIĆ, R.

**Winter hosts of *Aphis fabae*. [Serbian, English summary 4 lines.]**

*Zasht. Bilj.*, Belgrade, 1952, No. 12, pp. 74-7, bibl. 4, illus.

At the Agricultural College, Zemun, *Aphis fabae* was found to overwinter in the egg stage on *Euonymus europaea*, *Viburnum opulus*, *Maclura aurantiaca* and *Spirea* van Houttei.

1896. STRACHAN, G., AND TOREASON, W. E.

**Maturity studies of vegetables in Alberta.**

*Rep. Proc. 8th annu. Mtg west. Canad. Soc. Hort.*, 1952, pp. 19-22, bibl. 20.

Methods of measuring the maturity of peas including testing in brine, chemical analyses and use of a crushing



device and various tenderometers are satisfactory, but they are unsuitable for beans and sweet corn. No suitable system for determining bean maturity has yet been found. A project to study methods of determining maturity in vegetables was started at the Lethbridge Experimental Station, but so far the work has been limited mainly to peas. Notes are given on the more outstanding observations made.

1897. STRACHAN, G., AND SHEWELT, L. A.

Prairie food processing research.

Rep. Proc. 8th annu. Mtg west. Canad. Soc.

Hort., 1952, pp. 15-18.

The most suitable varieties of beans, sweet corn and raspberries, frozen in 1950 and evaluated after 9 months storage, are listed. Nutritive data on 6 vegetable groups grown at Lethbridge are tabulated.

### Mushrooms.

1898. LAMBERT, E. B., AND AYERS, T. T.

An improved system of mushroom culture for better control of diseases.

Plant Dis. Repr., 1952, 36: 261-8, bibl. 4.

A system of mushroom culture using a new "two-phase pasteurizing" is described. In the experimental rooms yields were surprisingly high when compared with commercial yields. These results are attributed to the accumulative effects of the following favourable factors: (1) A poultry litter supplement increases yields by about  $\frac{1}{2}$  lb. of mushrooms per sq. foot. (2) A short outdoor composting (15 days), with high initial heat, and the comparatively low temperature of the second phase of pasteurization conserve carbonaceous material. (3) The high temperature of the first phase eliminates most of the harmful organisms. (4) The low temperature of the second phase is beneficial probably through favourable nutrient changes and the conservation of moisture in the bed. (5) The comparatively high heat-generating capacity of the compost, due to its "greenness" when placed in the beds, permits of an aerated pasteurization of compost of high moisture content. (6) The continuous forced ventilation provides an adequate supply of fresh air at all times. (7) The pasteurization of the soil undoubtedly reduces the population of harmful organisms. (8) The use of parzate and lindane on the surface of the beds permits continuous and extended cropping at approximately 60° F., but the use of lindane is not recommended in commercial houses until tolerances have been determined for it.—U.S. Dep. Agric., Beltsville, Md.

1899. STOLLER, B. B.

Studies on the function of the casing for mushroom beds. Part III. The use and characteristics of peat as a casing for mushroom beds.

Bull. Mushroom Gr. Ass., 1952, No. 36, pp. 352-60, bibl. 8.

Non-fibrous (as distinct from fibrous) peat has been used as a casing for 5 years in Duluth, Minnesota, and crops of 2 lb. or more per sq. foot have repeatedly been obtained. To prepare the wet, acid peat from the bog it must be mixed with about 6% limestone and 3% gypsum, and screened. After the mycelium has grown into the casing, the peat must be almost saturated with water (80% moisture) to initiate fructification. The addition of P may increase yield but that of soluble

N inhibits fruiting. Of a dozen named chemicals added an increase in yield appeared to be obtained with dithane D-14 alone. In untamped beds the mushrooms were numerous and small, had relatively thin stems and opened quickly. Firmly tamped beds produced large, stout-stemmed mushrooms. Mycelium grew very densely in peat casing. Oxygenation may be more difficult on this account but water absorption is better.

1900. ANON.

Zibimate—the new selective fungicide.

Mushroom News, 1952, 3 (7): 144-5, from

abstr. in Rev. appl. Mycol., 1952, 31: 531.

In trials on the Experimental Farm at Angmering, Sussex, zibimate dust, containing 15% of the active ingredient zineb and used at 3 to 4 oz. per 1,000 sq. ft. of bed space, gave the best results against fungi attacking mushrooms. It is intended primarily as a preventive, to be applied before the appearance of the first break, and where used from the time of casing gave excellent control of bubble (*Mycogone*). For *Dactylium* and *Verticillium* which are more resistant, the treatment should be started early and continued regularly. Bacterial spot [unspecified] was also found to respond to zibimate treatment. An electric fan placed in the centre of the house facilitates even distribution of the dust.

### Onions and related crops.

(See also 1979n, s.)

1901. MUNGER, H. M.

Onion hybrids and varieties.

A.R. Veg. Gr. Ass. Amer., Inc., 1951, 1952, pp. 49-54.

A popular account is given of the breeding of onions from the original male-sterile Italian Red 13-53 found in California in 1925. The position regarding hybrid onions in various parts of the United States is then reviewed. Recent developments which may have an important effect are the use of maleic hydrazide to inhibit sprouting during storage, and of carbamate sprays such as dithane and parzate to control downy mildew and blast.

1902. KRICKL, M.

Der Einfluss der Witterung bzw. der Temperatur auf die Reife der Zwiebelpflanzen. (The effect of weather and temperature on the ripening of onions.)

Bodenkultur, 1951, 2. Sonderheft, being Jb. Bundesanst. Pflb. Wien, 1950, pp. 285-90, bibl. 2.

In unfavourable years a comparatively high percentage of onion bulbs do not reach full maturity. The author selected strains requiring relatively low temperature sums for full development by harvesting early maturing bulbs separately. The plants had to be grown under field conditions, not in frames, for the selection to be effective.

1903. STOLL, K., AND KLINKOWSKI, M.

Zur Frühdiagnose der Austriebsneigung lagernder Küchenzwiebeln (*Allium cepa*). (An early diagnosis of the tendency to sprouting in stored onions.)

Züchter, 1951, 21: 256-75, bibl. 15 [received 1953].

In order to facilitate the selection of late-sprouting strains, the authors attempted to find a simple method of ascertaining the keeping quality of onions. Specific gravity alone or in conjunction with the amount of  $\text{CO}_2$  emitted or with the relative water loss during storage, was shown to give an indication of sprouting tendency. The data obtained in these tests, however, do not as yet constitute a sufficient basis for early, clear determination of early and late sprouting bulbs.—Aschersleben Branch of the Biol. Zentralanstalt.

1904. KRICKL, M.

Praktische Beobachtungen über den Einfluss verschiedener Faktoren auf das "Schiessen" von Steckzwiebeln. (Observations on the effect of several factors on bolting in onion sets.)

Bodenkultur, 1951, 2. Sonderheft, being Jb. Bundesanst. Pflb. Wien, 1950, pp. 273-84, bibl. 6, illus.

Many years' experiments showed that storage at a low temperature (3-6° C.) favours the tendency to bolting in onions. Three to four weeks' treatment in the incubator at 35-40° C. in February completely suppressed flowering in small bulbs (up to 2.5 cm.) and reduced bolting in large bulbs (2-6.4 cm.). Storage at a constant temperature exceeding 20° C. prevented flowering also in large bulbs. This treatment or 4 weeks' storage in the incubator at 37.5° C. was found to have a growth-promoting effect and to increase the yields of onions. In one year a cold spell in July caused an unusually high number of plants selected from small bulbs (0.7-2.0 cm.) to flower, although normally this lot would not have contained any bolters. In contrast, the percentage of bolters from larger bulbs was not increased. It seems, therefore, that onion sets from small bulbs are susceptible to severe fluctuations in temperature.

1905. STATENS FORSØGSVIRKSOMHED I PLANTEKULTUR.

Forsøg med forskellig behandling af spiseløg efter optagning. Foreløbig meddelelse. (Experiments on the post-harvest treatment of onions. Preliminary communication.) Tidsskr. Planteavl, 1952, 56: 175-6, being Medd. Statens Forsøgsvirks. Plante kult. 483.

Preliminary data on different pre-storage and storage treatments of shallot and onion sets are tabulated and briefly discussed. The trials are being carried out at Hornum.

1906. LJUDKIN, F. M.

Methods of storing onion sets in the northern zone. [Russian.]

Sad i Ogorod, 1952, No. 11, pp. 55-7.

Of the 5 methods of onion set storage tested, i.e. in warm (18-20° C.) onion stores with and without pre-planting heat treatment, warm storage during autumn and cold (-1 to +3° C.) in winter, and in vegetable stores with and without pre-planting heat treatment, the third, so-called warm-cold, method was found the most satisfactory, producing the highest yields of onions. The reactions of some varieties to the different methods of storage are noted.

1907. AGLIBUT, A. P., AND TACLAY, F. L.

The influence on red globe onion of different amounts of surface and subsurface irrigation water.

Philipp. Agric., 1951, 35: 233-51, bibl. 1, illus. [received 1953].

In experiments on established seedlings grown in metal drums in the open at the Central Experimental Station, Laguna, the rates of irrigation used were from 10 to 75% of the water-holding capacity of the soil and water was applied twice weekly. In the rainy season crop, surface irrigation was superior to sub-surface; 30% gave the highest mean weight of surface-irrigated plants (106.7 g.) and 15% that of sub-surface-irrigated plants (78.8 g.). In the dry season crop, sub-surface irrigation was superior; 10% gave the highest mean weight of sub-surface-irrigated plants (122.58 g.) and 45% that of surface-irrigated plants (96.35 g.).

1908. VIENNOT-BOURGIN, G.

Une maladie à sclérote des bulbes et des feuilles d'oignon, nouvelle pour la France. (A sclerotial bulb and leaf rot of onion newly recorded in France.)

C.R. Acad. Agric. Fr., 1952, 38\*: 569-70.

In the winter of 1951/52 near Rennes *Botrytis squamosa* caused severe leaf symptoms in silver-skinned onions. This is the first record of the fungus in France. Biology and morphology of the fungus are discussed and the symptoms caused in onions are briefly described.

1909. LARSON, R. H., AND WALKER, J. C.

Arasan for smut control in set-onion plantings.

From abstr. in *Phytopathology*, 1952, 42: 469.

In trials for the control of onion smut (*Urocystis cepulae*), the standard commercial formaldehyde-drip treatment gave 6.4% diseased plants, while, when  $\frac{1}{10}$  lb. of Arasan (tetramethyl thiuram disulphide) per lb. of seed was used as a dry seed treatment without sticker, the average incidence of smut was reduced to 3.3%.

1910. SCHREIER, O.

Über Auftreten und Bekämpfung der Zwiebelfliege (*Hylemyia antiqua* Meigen). (Incidence and control of the onion fly.) [English summary  $\frac{1}{2}$  p.]

PflSch. Ber. Wien, 1953, 10: 4-18, bibl. 12.

*Hylemyia antiqua* is the most important onion pest in Austria, where 3-4 generations appear per year, injuries by the first generation towards the end of May causing the most serious losses. In experiments on control of the fly the best results were obtained by watering the plants with either 0.06% E605 forte or 0.4% gamma-Spritz-Nexit (=lindane) as soon as the first symptoms appeared. Preventive treatment proved unsuccessful.

1911. SCHOLES, M. E.

The effect of hexachlorocyclohexane on mitosis in roots of the onion (*Allium cepa*) and strawberry (*Fragaria vesca*).

J. hort. Sci., 1953, 28: 49-68, bibl. 23, illus.

Experiments were carried out with a proprietary flea beetle dust containing crude BHC to ascertain whether it has any effect on cell division. Root-tips of onion

\* Printed as Vol. 39 in error.



seedlings and strawberry runners were used as test material and the doses were equivalent to 40-200 lb. per acre of flea beetle dust. By germinating onion seeds in direct contact with the insecticide it was shown that it has two effects on the chromosomes. The frequency of nuclear divisions was unaffected, but low doses may lead to the exclusion of nuclear fragments in subsequent cell divisions and higher doses may lead to polyploidy. Both effects were produced by the dust and the gamma and delta forms of BHC when used separately. The hazards which may be involved in the widespread use of BHC as an insecticide are discussed. It is clear that the effects on the chromosomes may lead to genetic changes in the affected plants or their progeny although these plants may appear to be unaffected. This is important in seed production or in growing plants in which the constitution of the progeny should remain unaltered. The use of fruit tree sprays containing BHC should also be carefully considered where young wood is used for scions in grafting. [From author's synopsis.]

#### 1912. CASTRONOVO, A.

Ensayos culturales con ajo en la región de Buenos Aires. (Cultural experiments with garlic in the Buenos Aires district.)

Rev. Invest. agric. B. Aires, 1950, 4: 409-16.

Replicated randomized block experiments were conducted at Castelar in 1947-8 and 1950-1 to determine the optimum size of garlic bulbs from which to take planting cloves, the optimum position in the bulb from which to take them, the optimum size of planting clove, and whether vertical planting (the present practice) or horizontal is preferable. In the first experiment the total yields were: from external cloves from large bulbs 3,544 g.; from internal cloves from large bulbs 2,519 g.; from external cloves from small bulbs 1,156 g.; from internal cloves from small bulbs 830 g. In the second experiment the total yields from large, medium and small cloves were 1,034, 871 and 393 g. respectively. In the third the yield from horizontally planted cloves was slightly but not statistically significantly greater than that from vertically planted ones. It is concluded that the best planting material consists of external cloves from large or medium bulbs and that horizontal should replace vertical planting which is more expensive.

#### 1913. CASTRONOVO, A.

Ensayos culturales con ajo en la región de Buenos Aires. II. (Cultural experiments with garlic in the Buenos Aires district. II.)

Idia, 1952, 5 (57): 21-4, being Publ. Inst. Fitotec. 151.

The following experiments on garlic were conducted at the Phytotechnical Institute, Castelar. *Yield*: In a replicated experiment 4 selected clones (3, 29, 7 and 22) originating from the Argerich district significantly outyielded the control (Colorado de Médanos). *Storage of planting material*: There was no significant difference in yield between 4 samples of Colorado de Médanos stored for 2 months in bunches at atmospheric temperature, in bunches at 10-15° C., in sacks at atmospheric temperature, and in sacks in the refrigerator. *Effect of weeds on yield*: In a randomized block experiment with 5 replications, plots containing clone 3 received 3 treatments, 1% sulphuric acid, hand-hoeing, control. Hand-hoeing gave a yield much superior to the other

treatments. The sulphuric acid controlled broad-leaved weeds but not the grasses, which in the course of time invaded the plots. *Planting distance*: Spacings employed were 30, 45 and 60 cm. between the rows and 5, 7.5, 10 and 15 cm. between plants in the rows. The plots at 30 x 5 cm. gave yields very significantly greater than any of the others.

#### 1914. ADAMSON, R. M.

Effects of various growing methods in leek seed production.

Sci. Agric., 1952, 32: 634-7, bibl. 1, illus., being Contr. Div. Hort., exp. Fms Serv. Ottawa, 778.

1. Close spacing (2 inches) of field-sown leek seedlings, although producing smaller individual seed-heads, gave higher seed yields than wider spacing (6 inches). 2. Early field-sowings tended to yield more heavily than those made later, although sowings made by 15 May were not significantly less productive than those made one month earlier. 3. Similar yields were obtained from plots transplanted 6 inches apart in July and from spring field-sowings thinned to 6 inches. 4. Fall transplantings from 1 June nursery sowings resulted in inferior yields. 5. No marked differences were found in seed germination between treatments. [Author's summary.]—Dominion Exp. Stat., Saanichton, B.C.

#### 1915. SCHMIDT, T.

*Alternaria porri* (Ell.) Neerg. als Erreger einer Blattfleckenkrankheit an Porree. (*Alternaria porri* as the causal agent of leaf spot in leeks.) [English summary 3½ lines.] PflSch. Ber. Wien, 1953, 10: 14, bibl. 2.

This is the first record of *Alternaria porri* on leeks in Austria. The fungus, which is very rare in Europe, has been isolated and the symptoms it causes are briefly described. Further work on the disease is in progress.

#### Rhubarb.

(See also 1979s.)

#### 1916. ANDERSON, R. H.

The red leaf disease of rhubarb.

Rep. Proc. 8th annu. Mtg west. Canad. Soc. Hort., 1952, pp. 82-4.

A summary is given of 21 answers received to a questionnaire, discussing the cause of the red leaf disease of rhubarb, its distribution, varietal resistance to it, and control. No chemical control is suggested, but certain cultural practices and the destruction of infected plants are said to be helpful.

#### Root crops.

(See also 1462, 1979h, v.)

#### 1917. REHM, S.

The origin of toxic ammonia in germinating garden beet seed.

J. hort. Sci., 1953, 28: 1-13, bibl. 14.

In germination tests with beet seed, the accumulation of a toxic substance in the filter paper or cotton may cause a lower germination percentage than would be obtained under natural conditions in soil. It had previously been thought that this inhibition was due to ammonia which was released by enzymes in the seed.

Experiments carried out by the Division of Horticulture, Pretoria, confirmed that inhibition was caused by free ammonia, but showed that this was formed as a result of the reduction of nitrate by the action of bacteria which develop in large numbers on germinating beet seed. In soil the formation of ammonia is harmless, but in the germination dishes it is inhibiting even in the smallest quantities. By disinfection the development of bacteria and the formation of ammonia can be prevented. The best results were obtained by dipping the seed for 20 minutes in a 0.5% solution of Aretan. It is proposed to make the disinfection an official method for the germination test with beet seed. It is suggested that substances formed by micro-organisms are probably the cause of many irregularities observed in germination tests. These substances are mainly toxic but some may be stimulating.

1918. BANGA, O.

Some factors in the growth rate of red garden beets. [Dutch summary  $\frac{1}{2}$  p.]

*Euphytica*, 1952, 1: 201-11, bibl. 5.

Experiments were made at the Institute of Horticultural Plant Breeding, Wageningen, to determine the growth rate of beetroots and the factors affecting it. It is concluded that growth rate of the roots is determined to a large extent by the foliage efficiency (calculated as foliage weight per 100 g. root) and the amount of foliage per plant. A short-top type of beet with high foliage efficiency is more resistant to reduction of growth rate in dry and cold weather than a large-top type of low foliage efficiency. In dry, hot weather a large-top type that naturally ripens late may be more satisfactory than a short-top type that naturally ripens early, for high temperature causes the foliage to be smaller and accelerates the ripening of the root. It is shown that the ratio of the potash content of the leaf to the potash content of the root can be used as an indication of the physiological type of red beets. A low leaf K: root K ratio indicates a type with a low sugar content in the root and a high growth rate of the root. [See also *H.A.*, 23: 774.]

1919. BANGA, O.

Some observations on the influence of the length of day on the leaf growth of red garden beets. [Dutch summary  $\frac{1}{2}$  p.]

*Euphytica*, 1952, 1: 43-8, bibl. 6.

Experiments made at the Institute of Horticultural Plant Breeding, Wageningen, showed that the average leaf weight of red garden beet is influenced by day-length, leaves growing larger in long days than in short ones. The number of leaves per plant, however, is not influenced by day-length. The foliage weight (number of leaves  $\times$  average leaf weight) per plant decreases during a period of decreasing day-length, as the large old leaves are replaced by smaller new ones. With beet sown before the middle of June this reduction of foliage weight usually starts in the first half of August. The decrease in day-length in late summer appears to be a limiting factor in the growth rate of the roots as a result of reduction in foliage weight. Occasionally temperature or other growth factors are more favourable for leaf production under short than under long day conditions, in which case the greater number of leaves produced may counterbalance their smaller size.

1920. YANKOVITCH, L.

Réaction de quelques plantes annuelles à l'accroissement de la fertilité. (The effect of increased soil fertility on some annual [vegetable] plants.)

*Ann. Serv. bot. agron. Tunis.*, 1950, 23: 161-77, bibl. 1 [received 1952].

In a replicated experiment to study the effect of various fertilizer levels on the growth and transpiration of beetroot, turnip, kohlrabi, radish and shallot, these plants were grown in tanks of poor soil, and a complete fertilizer was applied at nil,  $\frac{1}{2}$ , normal,  $1\frac{1}{2}$ , double and treble doses, the normal rate being 120 kg. N, 60 kg.  $P_2O_5$ , 150 kg.  $K_2O$  and 50 kg. MgO per ha. Detailed results are given. A summary of these is (1) the greater the plant's need of fertilizer the greater is the increase in weight of green matter which results from the application of fertilizer (beetroot and turnip thus profited most from abundant fertilizer); (2) except in the case of shallot, the % dry matter content of the leaves and storage organs diminished with increased application of fertilizer; (3) the coefficient of transpiration was greatly increased by the first half dose of fertilizer, but further doses had no appreciable effect.

1921. HAGIYA, K.

Physiological studies on the occurrence of the "pithy tissue" in root crops. I. On the formation of pithy tissue during the growth of radish. [Japanese, with English summary  $\frac{1}{2}$  p.]

*J. hort. Ass. Japan*, 1952, 21: 81-6, bibl. 13, illus.

The development of pithiness in over-sized radish roots was associated with (1) the disappearance of sugar from the large parenchymatous cells of the xylem and subsequently from neighbouring tissues; (2) a rapid increase in the length and number of leaves and weight and diameter of roots and a reduction in the top/root ratio; and (3) an increase in the size and number of parenchymatous cells. It would appear that during the rapid growth of the cells their sugars are used up and they become starved of nutrients owing to the severing of connexion with the conducting tissues.

1922. McLEAN, D. M.

Occurrence of yellow-net virus disease in table beet seed plants in northwestern Washington.

*Plant Dis. Repr.*, 1952, 36: 241-2, bibl. 8.

From symptoms and host range it is concluded that the yellow-net disease in northwestern Washington is similar to that reported from California and is probably caused by the same virus. Only plants in the genus *Beta* have been experimentally infected with this virus.—U.S. Dep. Agric.

1923. ROLAND, G.

Étude de deux viroses du navet: la mosaïque et la jaunisse. (A study of two virus diseases of turnip; mosaic and infectious chlorosis.)

*Parasitica*, 1952, 8: 97-111, bibl. 14, illus.

Two virus diseases isolated from turnips in Belgium are described. *Brassica virus 1* causes mosaic of turnip and can infect a number of other cruciferous plants as well as *Nicotiana glutinosa*, *N. langsdorffii*, *N. tabacum*, *Petunia hybrida* and *Spinacia oleracea*; it is non-



persistent, transmitted by sap and by the aphid *Myzus persicae*, and inactivated after ten minutes heating at about 55° C. *Brassica virus 5* apparently infects only turnip, causing a yellowing or reddening of the outer leaves; it is persistent, not sap transmissible and *Myzus persicae* is its vector. The elimination of cruciferous weeds is advised.

1924. YALE, J. W., AND VAUGHAN, E. K.

Relative importance of seed and soil borne infection in damping-off of garden beets.

From abstr. in *Phytopathology*, 1952, 42: 520.

Isolation and soil inoculation studies have shown damping-off in table beets in the Willamette Valley of Oregon to be caused primarily by *Pythium ultimum* and *Fusarium* spp. *Fusarium* spp., as well as other fungi, were shown to be present in the seed balls. An experiment indicated that seed-borne organisms were relatively unimportant as causes of damping-off and that seed-borne pathogens do not move rapidly from diseased to healthy seedlings in sterile soil.

1925. BAKKER, M.

Resultaten van de proeven ter bestrijding van de phomopsisziekte in zaadwortelen. (Control of the phomopsis disease in seed umbels of carrot.)

Meded. Dir. Tuinb., 1952, 15: 879-83, bibl. 2, illus.

The umbels of carrots for seed may be attacked by *Phomopsis dauci*. As in field tests carried out in 1950 [see H.A., 22: 557], bordeaux mixture (1 and 1.5%) gave the best results followed by copper oxychloride 0.75% and Zerlate 0.4%; Dithane Z78 at 0.4% gave fairly good control. Shirian and a copper emulsion were not effective. The plots were sprayed every 8 to 10 days. The plants are susceptible until the end of August, so that it is necessary to continue spraying until then.

1926. DE CARVALHO, J. C.

Uma nova espécie de *Mononchus*. (Nematoda, Mononchidae.) (A new species of *Mononchus*.) [English summary 9 lines.] *Bragantia*, 1951, 11: 51-4, bibl. 1, illus. [received 1953].

*Mononchus ibitiensis*, a cannibal nematode, was found associated with carrot roots at Ibiti in Brazil.

1927. FRITZSCHE, R.

Schädliche und nützliche Wanzenarten an Möhren (*Daucus carota* L. ssp. *sativa*). (Injurious and useful plant bug species on carrots.)

*NachrBl. dtsh. PflSchDienst*, Berlin, 1952, 6: 228-9, bibl. 8.

Plant bug species found on carrots at Aschersleben included, besides the pest *Lygus campestris* L., the useful species *Anthocoris pilosus*, which in laboratory experiments was shown to be predacious on *Trioza viridula*. *A. pilosus* is also thought to be a natural enemy of several aphid species.

1928. SHAW, M. W.

Carrot fly control.

*Scot. Agric.*, 1952, 32: 152-8, bibl. 10.

In replicated experiments conducted at 4 stations in the north of Scotland in 1951 a BHC dust containing 45%

gamma isomer was applied in the seed drill or on the surface at rates varying from 1 oz. per 10 feet to 1 oz. per 30 feet. The results, which are given in detail, suggest that 1 oz. per 7-9 yards, preferably in the drill, will give good control under garden conditions. In 4 tasting experiments 79-92% of the tasters found the flavour normal.

### Salad crops.

1929. ANON.

Enkele ervaringen met het nieuwe slaras Proeftuin's Blackpool. (Some experiences with the new lettuce variety Proeftuin's Blackpool.)

Meded. Proefst. Groent. Fruit Glas, 1952, No. 9, p. 1.

Trials at the Naaldwijk Research Station and in commercial gardens have shown that the new lettuce variety Proeftuin's Blackpool is better than May Queen only when growing conditions are unfavourable, as when there is insufficient light or saline or cold soil. It is very suitable for heated glasshouse culture. Under optimum conditions of light and soil, its stiffer, darker leaves and smaller head make it inferior to May Queen.

1930. KRAUSE, W. G. C.

Tipburn on early lettuce.

*Comm. Grower\**, 1952, No. 2971, pp. 1043-4.

This physiological disease of unknown cause is apparently common in the U.S.A. and Holland though rare in Britain. The edges of the younger (but not the very inside) leaves become yellow after the head has formed, and later brown and shrivelled. At the latter stage secondary bacterial or fungal infection often occurs. According to Dutch experience May Queen and Northern Queen are the most susceptible varieties while Early French Frame and Blackpool are resistant. Probably the least susceptible variety is Cheshunt 5B. Factors rendering plants liable to attack are those influencing the functioning of the roots and the rate of transpiration, too lush growth, and Mg and B deficiency.

1931. GROGAN, R. G., WELCH, J. E., AND BARDIN, R.

Common lettuce mosaic and its control by the use of mosaic-free seed.

*Phytopathology*, 1952, 42: 573-8, bibl. 9, illus.

A description is given of experiments to test the use of disease-free seed as a control. A sample of mosaic-free seed was produced by roguing all seed-borne infected plants under aphid-free greenhouse conditions after which the remaining healthy plants were grown to maturity in an isolated area. The resulting seed proved free of mosaic and was used to plant experimental plots in commercial fields. Results of field trials showed that the spread of common mosaic under California conditions is mainly a local phenomenon and that the use of mosaic-free seed is an effective means of controlling the disease in large scale field plantings. [From authors' summary.]

\* Formerly *Fruitgrower*.

1932. LAST, F. T.

The use of tetra- and penta-chloronitrobenzenes in the control of *Botrytis* disease and *Rhizoctonia* attack of lettuce.

*Ann. appl. Biol.*, 1952, 39: 557-68, bibl. 3.

Talc dusts containing 5, 10 and 20% of the compounds were used in frames and in the field. 5% tetrachloronitrobenzene (applied to the foliage) was the most effective against *Botrytis cinerea*, and 20% penta-chloronitrobenzene (mixed with the soil) against *Rhizoctonia solani*.

1933. WENE, G. P.

Control of the red lettuce aphid.

*Proc. 7th Annu. Rio Grande Valley hort.*

*Inst.*, 1953, pp. 67-9, bibl. 2.

Results of 2 field experiments are reported. In the first, 1 pt in 15 ga. water per acre of 40% TEPP proved more effective in controlling the red lettuce aphid, *Microsiphum ambrosiae*, than 0.5 pt of 40% or 1 pt of 20% TEPP; leaf scorch injury by the higher concentration was hardly noticeable 1 week later. In the second, 1% rotenone dust gave as good control as 2% parathion dust; 1% parathion and 1.5% metacide dust also gave good control but with less residual effectiveness.

1934. ANON.

Situation économique de la culture de witloof. (The economics of witloof chicory growing [in Belgium].)

*Courr. hort.*, 1952, 14: 533.

Belgium produces approximately 60,000 tons of witloof chicory annually, about half of which reaches the market from December to March. Export figures are given.

### Spinach.

(See also 1483.)

1935. SMITH, W. L., JR.

Streptomycin sulfate for control of bacterial soft rot of packaged spinach.

*Abstr. in Phytopathology*, 1952, 42: 475.

Spinach was sprayed with streptomycin sulphate (0.1%) plus Tween 20 (0.5%) 5 days or 1 day before harvest. At harvest it was washed in water containing soft rot bacteria, packaged in pliofilm sacks, and held at 70° F. No decay was evident after 1 day, decay was rarely evident after 2 days, but many sacks were non-saleable in 3 days. They became mushy masses in 4 to 5 days. Spinach field-sprayed at the same time with Tween 20 (0.5%) only and then washed in a bacterial suspension, showed decay in 1 day, was non-saleable in 2 days, and was a mushy mass in 3 days. Dipping non-sprayed freshly-harvested spinach in water containing soft rot bacteria and streptomycin sulphate (0.1%) plus Tween 20 (0.5%) gave better decay control than field spraying. Instant, 5-, and 10-minute dips were equally good. Spinach dipped in Tween 20 (0.5%) plus bacteria showed slightly more decay than the field-sprayed. Sprayed spinach stored 2 days at 32° decayed faster at 70° than freshly harvested sprayed spinach. Non-sprayed spinach stored 2 days at 32° and then dipped also showed faster decay at 70° than the freshly harvested dipped.

### Tomatoes, egg plants and peppers.

(See also 1438, 1455, 1457, 1464, 1467, 1471, 1503m, 1834, 1979b, d, e, f, g, j, t, u, x, 2392.)

1936. CAWTHRON INSTITUTE.

Tomato research.

*A.R. Cawthron Inst., N.Z.*, 1951/52, pp. 19-22.

**Soil sterilization:** Under glasshouse conditions using a standard fertilizer mixture, steam, chloropicrin, chloropicrin and D-D mixture all gave good growth of tomato plants and a high yield of fruit, typical yields being 3.2 lb. per plant from the unsterilized plots and 9.7 lb. from each of the treated plots. Unsterilized and steam treatments have been maintained on the same plots for nine successive seasons, and chloropicrin treatment for 6 seasons. The percentage of first grade tomatoes was highest on the unsterilized plot (68%) and lowest on the steam plot (36%). **Soil amendments:** Compost (rotted clover straw), used at the rate of 15 tons per acre for the sixth successive season on steamed glasshouse soil, again gave the highest yield, 10.6 lb. per plant compared with 9.7 lb. for the control with standard fertilizer only. Quality of fruit on the compost treated plot was rather better than on the control plot. Cocoa bean husks, used in unsterilized soil at the rate of 10 tons per acre, for the sixth successive season again gave a considerably higher yield than the corresponding plot without cocoa husks. **Fertilizer effect on fruit quality:** Plots with standard fertilizer and with standard fertilizer supplemented by additional potassic or potassic and nitrogen fertilizers were compared under both heavy and moderate rates of watering. Under both rates of watering the additional fertilizer applications exercised a beneficial effect on the percentage of first grade fruit. This was particularly marked under the moderate watering programme where the additional K or K and N application increased the percentage of first grade fruit from 25% on the control plots to 51 and 58% respectively. The improvement in quality was accompanied, however, by a reduction in yield of approximately 1 lb. per plant. **Cloud:** Chemical tests showed that cloud in glasshouse tomatoes is associated with low dry matter and reduced carbohydrate content of fruit and leaves. Treatments resulting in less vigorous growth were found to reduce the incidence of the trouble and to improve fruit quality. **Mulching with sawdust:** Yield and quality of outdoor tomatoes benefited from a 2-in. layer of sawdust combined with the highest of three levels of nitrogen.

1937. CHESHUNT.

Tomatoes; experimental results of 1951.

*A.R. Cheshunt exp. Res. Stat.* 1951, 1952, pp. 14-18.

(1) The effect of raising young plants in pots and in soil blocks has been compared further and, in general, crop yields have been in favour of the soil block plants. (2) The deficiency experiments continued to give the same results in respect of blotchy ripening, unmanured and potash deficient plants yielding 12.35 and 48.27% blotchy fruit respectively. (3) Yields from plots injected with DD were about 10% less than those from steam-sterilized plots, but *Heterodera marioni* control proved successful in both cases. (4) In the variety trials the new variety Potential attracted a great deal of attention from



growers. Other promising varieties were Delicious, Corleys and Dufferns Seedling.

1938. WHALEY, W. G.

Hybrid vigor in a tomato cross.

*Bot. Gaz.*, 1952, 114: 63-72, bibl. 15, illus.

Growth and development of two inbred lines of tomato and their hybrid were followed with respect to increase in weight, increase in height, differences of branching pattern, total phosphorus content, total nitrogen content, total starch content, catalase activity of the stem tips, and total proteolytic activity of germinating seeds and seedlings. The morphological data indicate an early established and subsequently maintained size advantage for the hybrid. No significant differences in total nitrogen, total phosphorus, or starch content were recorded. The hybrids appeared to have higher catalase activity in stem tips, and there definitely were differences in the pattern of development of total proteolytic activity. The results suggest that in certain instances the investigation of the bases of heterosis should be confined to the early growth stages and should deal with differences in the development of the enzyme systems and their activity. [Author's summary.]—Plant Res. Inst., Univ. Texas, and Clayton Foundation for Research.

1939. LECRENIER, A., AND TILKIN, N.

Étude du rendement de quelques variétés de tomates en 1952. (Tomato yield trials in 1952.)

*Bull. hort.*, Liège, 1953, 8: 42-9.

In continuation of an investigation begun in 1951 the Gembloux Research Station conducted yield trials with 20 tomato varieties at 10 horticultural schools in different parts of Belgium in 1952. The results for the 2 years show that the varieties of the Tuckwood group are well suited to Belgian conditions of soil and weather and give satisfactory yields in the open in good years and bad. Details are given of the yields of varieties successful for particular purposes.

1940. ROSENHECK, K., AND OTHERS.

Chemical studies on tomatoes grown in Israel.

*Bull. Res. Coun. Israel*, 1952, 2: 129-34, bibl. 8.

Data on total soluble solids, acidity, pH, colour, vitamin C, chloride, pectic substances and pectolytic enzyme activity are reported for tomato varieties grown in different localities and under different conditions in Israel.

1941. GARDNER, E. J.

Studies on the inheritance of resistance to curly top and vitamin C content in tomatoes. From abstr. in *Proc. Utah Acad. Sci. for 1949/50 and 1950/51*, 1952, 27\* and 28\*: 69-70.

Vitamin C contents recorded are: the red currant tomato, *Lycopersicon pimpinellifolium*,  $59.2 \pm 2.80$  mg./100 g. fruit, 8 red fruited commercial tomato varieties  $17.4 \pm 0.70$  to  $21.4 \pm 0.80$  mg./100 g., and hybrids between the species intermediate values. Studies are also reported on the resistance of these species and their hybrids to curly top.

\* Issued in a single volume with continuous pagination.

1942. HULL, H. M.

Carbohydrate translocation in tomato and sugar beet with particular reference to temperature effect.

*Amer. J. Bot.*, 1952, 39: 661-9, bibl. 28, illus.

Although most works on temperature effects on carbohydrate translocation show a retardation at near-freezing temperatures, the experiments described all indicate an equal or greater translocation at  $1^{\circ}$ - $3^{\circ}$  C. as at  $20^{\circ}$  C.—Earhart Plant Res. Lab. and Kerckhoff Labs. of Biol., Calif. Inst. of Tech., Pasadena.

1943. LEONARD, E. R.

Plant physiology.

*A.R. Cheshunt exp. Res. Stat.* 1951, 1952, p. 84.

For one season and one variety the root development of glasshouse tomato plants was studied in relation to growth of the tops. From the observations carried out in a glass-sided box and a glass-lined trench the following conclusions were drawn: (1) Stem length increases regularly throughout the growth period. (2) Leaf number on the main stem shows a steady rate of increase until about the time that ripening of fruit begins, and then a slow, progressive decrease. Due to 'leafing' an early, steady value is reached. (3) Roots of both 1 mm. and less than 1 mm. diameter show four consecutive phases of growth: (a) a rapid rise to a peak value; (b) followed by marked decline; (c) there is then a gradual rise, with short-term fluctuations, to (d) a new, sustained high level towards the end of the season in the thinner roots, but a continued decline in the thicker ones. These four phases in root development are also seen if the total root length is sub-divided into the lengths present in successive vertical layers of soil. The peak of root development between phases (a) and (b) is associated with the setting of the first fruit trusses, and the recovery phase (c) with the removal, on harvesting, of the fruit from the lower trusses.

1944. HAZINA, E. P.

Repeated back grafting as a method of enhancing changes in the inherited characters of plants. [Russian.]

*Doklady Vsesojuz. Akad. sel'sk. Nauk*, 1952, 17 (6): 9-11, illus.

The tomato variety Humbert grafted on nightshade cropped earlier and produced larger fruit of improved quality. The effects of grafting were enhanced when each of the 4 successive seed generations was back-grafted onto nightshade stock.

1945. HOWLES, R.

Heat treatment of tomato seeds.

*A.R. Cheshunt exp. Res. Stat.* 1951, 1952, pp. 32-7, bibl. 2.

Heat treatment of tomato seed for relatively short periods was found to have a considerable effect on seedling development. Thus, a 4-hour treatment at  $150^{\circ}$  F. increased seedling weight by 50%. Preliminary data on the effect of heat treatment on virus content are tabulated, suggesting that there is not much hope of cleaning badly infected tomato seed by this method. With autumn-sown lettuce, however, seedlings from heat-treated seed may be rogued within one month at the tray stage.

1946. CHROBOCZEK, E., AND NEKANDA-TREPCZYNA, Z.

Wpływ kopczykowania na wczesność i wysokość plonu pomidorów przy dwóch sposobach cięcia. (The effect of earthing up on the earliness and yield of tomatoes pruned by two different methods.) [English summary 1½ pp.]

*Rozn. Nauk Roln.*, 1950, 54: 299-314, bibl.

17 [received December 1952].

With many Polish growers it is standard practice to earth up staked tomatoes. Two years' experiments, however, showed that this operation tends to reduce early yields though late yields may be somewhat increased. Two methods of training were also compared.

1947. HUDSON, J. P., AND SALTER, P. J.

Watering tomatoes under glass.

*Gdnrs' Chron.*, 1953, 133: 32-3, bibl. 6, illus.

Under the conditions of the experiment described, there was a correlation between the type of water regime in which the plants were grown and the yield of ripe fruits produced, the wetter treatments tending to produce the highest yields. When water was applied at soil tensions of 7 and 15 (cm. Hg) throughout the season two varieties gave higher yields than when water was applied at tensions of 30 or 60.—Dep. Hort., Univ. Nottingham.

1948. OKUDA, A., AND SHIMOSE, N.

Studies on nitrogen metabolism of crops.

*J. Sci. Soil. Man. Japan*, 1951, 22: 88-90, from abstr. in *Soils and Ferts*, 1952, 15, No. 2100.

A comparison was made of  $\text{NO}_3\text{-N}$  and  $\text{NH}_4\text{-N}$  as nitrogen sources for tomatoes. In general,  $\text{NO}_3\text{-N}$  was better than  $\text{NH}_4\text{-N}$ , but the degree varied with conditions such as pH and other ion concentrations of the culture solution.

1949. LAWTON, K., ERICKSON, A. E., AND LEMON, E.

Utilization of phosphate fertilizer by several crops using radioactive phosphorus.

*Quart. Bull. Mich. agric. Exp. Stat.*, 1952, 35: 147-55, illus.

Radioactive tracer techniques used to determine the percentage of fertilizer phosphorus in several crops [including tomatoes] showed that an inverse relationship exists between the native available P by soil test and the percentage of fertilizer P in the plant. A considerably higher percentage of plant P derived from fertilizer was found in this study than has been reported for similar crops grown under field conditions. [From authors' summary.]

1950. MAZAEVA, M. M.

The effectiveness of growth stimulators at various levels of phosphate nutrition of plants. [Russian.]

*Doklady Akad. Nauk S.S.S.R.*, 1951, 80: 957-60, bibl. 8, illus. [received Dec. 1952].

The lower the P nutrition of plants the stronger is the effect of stimulators. Data are presented showing that heteroauxin and  $\beta$ -indolebutyric acid applied to pot grown tomatoes receiving NK fertilizer had a more stimulating effect on both growth and yield than

when applied to plants receiving NPK. The nature of this phenomenon is yet unknown, but one of the possible explanations offered is that P stimulates the formation of growth substances and additional applications in the presence of adequate P do not bring about further obvious effects. A single 0.015% heteroauxin treatment of roots before transplanting was almost as good and was less laborious than repeated blossom treatments at 0.0015% concentration. The  $\beta$ -indolebutyric acid was applied to the blossom only at 0.0005% concentration.

1951. STRONG, M. C.

Effects of certain environmental conditions on the production of greenhouse tomatoes.

*Quart. Bull. Mich. agric. Exp. Stat.*, 1952, 35: 3-9, bibl. 9, being *Contr. Dep. Bot. Plant Path., Mich. St. Coll.* 52-11.

Tests on four successive spring tomato crops of the effect of relative humidity and temperature levels in the greenhouse at the time of pollination or treatment with growth regulators indicate no relationship between relative humidity and yield. However, temperature at time of either pollination or treatment with growth regulators does affect the percentage of blossoms setting fruit as well as the ultimate size of fruit, 80° F. being optimal for best yield. There was no effect of humidity and temperature levels in the greenhouse at time of pollination or treatment with growth regulators on subsequent time required for maturation of fruit. Time of maturation shows an inverse correlation with solar radiation during the period of fruit development. The seasonal yield per plant was also related to solar radiation. [Author's summary.]

1952. DHAWAN, N. L.

Studies on the effects of growth-regulating substances on fruitfulness in field-grown tomatoes and the relation between seed formation and the production of growth-regulating substances in the fruit.

*Dissert. Abstr.*, 1952, 12: 292.

In 1949 para-chlorophenoxyacetic acid (PCPA) used as blossom spray and alpha-chlorophenoxypropionic acid (CPP) used as an entire-plant spray, when applied to male-sterile John Baer tomato plants, resulted in considerable fruit development, but as soon as spraying was stopped fruit setting stopped. Growth substances CPP, PCPA, 2,4-dichlorobenzoic acid (2,4-DB), betanaphthoxypropionic acid (BNP) and 2,4-dichlorophenoxyacetic acid (2,4-D) failed to induce fruit set on male-sterile John Baer tomato plants when applied in transplanting solutions to roots of plants. In 1949 the various treatments applied to normal John Baer tomato plants gave the following results: PCPA in a blossom spray had little effect on yield while CPP in an entire plant spray significantly reduced early yield. In transplanting solutions, PCPA significantly reduced yields while CPP had little effect. Transplanting solutions containing 50 p.p.m. of 2,4-DB increased early yields. High positive correlations were found to exist between seed number and fruit weight in 1949 and in 1950 experiments, except with fruits from plants sprayed with CPP (entire-plant spray) and PCPA (blossom spray). It was found that fruits containing seeds produced more auxin during early stages of development than did



seedless fruits.—[From author's abstract.]-Univ. of Minnesota.

1953. PERSSON, A. R.

Försök med vekststoff for fruktsetting i frilandstomat. (Experiments with growth substances for fruit setting in outdoor tomatoes.) [English summary  $\frac{3}{4}$  p.] Reprinted from *Gartneryrket*, 1950, No. 3, *Prelim. Rep. Inst. Veg. Crops, Norwegian agric. Coll.*, 1 (n.s.), pp. 10, bibl. 6 [received Dec. 1952].

Of the three periods in the development of a tomato plant, viz. (1) sowing to flowering of the first truss, (2) flowering to pollination, and (3) pollination to ripening of the first fruit, (1) and (3) were fairly constant, whereas the length of (2) was found to vary under outdoor conditions in Norway at 60° northern latitude. In these circumstances the application of  $\beta$ -naphthoxyacetic acid proved beneficial.

1954. LEOPOLD, A. C., AND GUERNSEY, F. S.

A role for malic acid in tomato fruit-set. *Arch. Biochem. Biophys.*, 1952, 41: 64-73, bibl. 15, being *J. Pap. Purdue agric. Exp. Stat.* 607.

Studies with excised flowers of a self-sterile strain of John Baer tomatoes have demonstrated that: 1. Malic acid, glutathione, and manganous sulphate each and collectively increase tomato fruit-set. 2. Of all the compounds known to promote fruit set, only malic acid will appreciably increase fruit set in the presence of glutathione and manganous sulphate. These findings suggest that the promotion effect of the three compounds in combination may be due to the decarboxylation of malic acid by malic decarboxylase. 3. The addition of two of the products of the malic decarboxylation reaction (carbon dioxide and pyruvic acid) each quantitatively inhibits fruit set in the presence of malic acid, glutathione, and manganous sulphate. 4. The addition of ascorbic acid with the three latter compounds further increases fruit set. These promotive and inhibitory effects suggest that the decarboxylation of malic acid may be beneficial to fruit set in the tomato. It is suggested that the beneficial effect of this system may be through the activation of a series of linked oxidation-reduction reactions. [Authors' summary.]

1955. DAVISON, R. M.

Plant injury caused by several types of hormones. *N.Z. J. Agric.*, 1952, 85: 319-20, illus.

Injuries caused by parachlorophenoxyacetic acid, used as a fruit-setting hormone on tomato and grapevine leaves, are described and illustrated. Leaf distortion of tomato by beta-naphthoxyacetic acid is also described.

1956. PELLUCHI, L., AND LEPORI, L.

Le virosi e le malattie virus-simili del pomodoro segnalate in Italia. (The virus and virus-like diseases of the tomato found in Italy.) [English summary 7 lines.] *Not. Mal. Piante*, 1952, No. 20, pp. 1-18, bibl. 40.

In this survey of the virus diseases of the tomato in Italy the distribution and symptoms are described of (1) leaf-curl and mosaic, (2) a form of spotted wilt, (3) apical bending, (4) aspermy with witches' broom,

(5) big bud, and (6) fern leaf, with their "differential" hosts (i.e. plants most suitable for their identification and study) and lists of the hosts of the viruses. An analytical key based on leaf, fruit, flower and stem symptoms is appended.

1957. ALEXANDER, L. J.

Effect of the tobacco mosaic disease on the yield of unstaked tomatoes.

From abstr. in *Phytopathology*, 1952, 42: 463.

Plants of Rutgers, Stokesdale, and a breeding line, 80 $\frac{1}{2}$ , were inoculated with tobacco mosaic virus at 3 different dates in each of 2 years, a yellow strain being used in 1950, a green strain in 1951. Results indicate that the yellow strain of the virus caused a greater reduction in yield than did the green strain, that delaying the time of infection reduced the loss, and that of the 3 varieties tested, the breeding line, 80 $\frac{1}{2}$ , was less seriously affected by tobacco mosaic.

1958. RAYCHAUDHURI, S. P.

Studies on internal browning of tomato.

*Phytopathology*, 1952, 42: 591-5, bibl. 29, illus.

A strain of tomato mosaic virus associated with internal browning of tomato in New Jersey was retained in tomato seeds for only 1 to 2 weeks, while the ordinary strain was retained for 27-28 days. Extracts of germinating tomato seeds had an inhibitory effect on infectivity of the virus. Internal browning of tomato could not be reproduced in tomato fruits by grafting diseased scions onto healthy stocks.—Rockefeller Inst., N.Y.

1959. KLEIN, R. M., AND KLEIN, D. T.

Effects of maleic hydrazide on initiation and development of tomato crown-gall tumors.

*Amer. J. Bot.*, 1952, 39: 727-30, bibl. 14.

Details are given of an experiment at the University of Chicago in which tomato plants received a fine spray (to dripping) of aqueous maleic hydrazide solution at 500 p.p.m. 5 days before, at the same time as, and 5 days after inoculation with crown-gall bacteria. The maleic hydrazide had no effect on the initiation and little on the development of the tumours.

1960. WINSTEAD, N. N., AND KELMAN, A.

Inoculation techniques for evaluating resistance to *Pseudomonas solanacearum*.

*Phytopathology*, 1952, 42: 628-34, bibl. 15.

The techniques used are described. Susceptibility decreased in resistant tomato plants as their age increased from 4 to 8 weeks. In the susceptible Marglobe and Louisiana Pink varieties there was no decrease in susceptibility with increase in age so long as conditions favoured rapid succulent growth.—N.C. St. Coll.

1961. WILLIAMS, P. H., AND EBBEN, M. H.

Brown root rot of the tomato.

*A.R. Cheshunt exp. Res. Stat.* 1951, 1952, pp. 22-6.

The microflora of the rhizosphere and of the root surface in steamed and unsteamed glasshouse soil was studied and the following fungi were isolated from plots infected with brown root rot: *Colletotrichum atramentarium*, *Myrothecium roridum*, *Trichoderma viride*, *Fusarium* spp., *Penicillium* spp. and the grey fungus K.

## 1962. STRØMME, E., AND FALK, K.

Kjemisk desinfeksjon av jord som middel mot brune røtter på tomat. (Chemical soil disinfection as a means of controlling tomato root rot.) [English summary 1½ pp.] *Forskn. Landbruk.*, 1952, 3: 77-92, bibl. 9, illus., being *Meld. Inst. Blomsterdyrk. Veksthusfors.*, norg. LandbrHøgsk. 47.

Larvacide, a chloropicrin preparation applied at the rate of 15 millilitres per 6 litres of soil, was found to have as good an effect on root growth and yield of glasshouse tomatoes in root rot infested soil as steam sterilization. Other soil fumigants tested proved less beneficial. The results of different treatments are tabulated and illustrated by photographs of the root systems.

## 1963. ROLL-HANSEN, J.

Damping av jord til tomat. (Steam sterilization of tomato soil.) [English summary 3½ pp.] *Forskn. Landbr.*, 1952, 3: 229-57, illus., being *Meld. Forsøksk. Kvithamar* 10.

Steam sterilization of glasshouse soil infested with brown root rot increased tomato yields from 10.5 kg. to 18.5 kg. per m<sup>2</sup> but delayed early ripening, yields of mature fruit up to 12 June, 1951, being 1.0 and 1.6 kg./m<sup>2</sup> on steamed and unsteamed soil respectively. The causes of the delaying action of steam remain to be determined. Analysis showed that plants grown in steamed soil had a lower content of dry matter and of calcium and a higher content of nitrogen, phosphorus, potassium, copper, manganese, zinc and iron than plants grown in untreated soil. Steaming in the spring increased the manganese content more than did steaming in the autumn. Plants growing in soil that had been treated in both autumn and spring had the highest Mn content. No such increase was found for zinc. The favourable effect of steam sterilization on yield was shown to be due partly to the better availability of nutrients and partly to brown root rot control.

## 1964. WILLIAMS, P. H., AND HACK, J.

*Didymella* stem rot.

*A.R. Cheshunt exp. Res. Stat.* 1951, 1952, pp. 26-9, bibl. 3.

Cultures made from the stems of wilted tomato plants showed that *Didymella lycopersici* may penetrate the interior of the stem for 10-16 in. above the visible lesion. In an experiment, in which fungus spores were introduced into the soil at varying depths, no infection occurred when the spores were buried 4 in. deep and only slight infection when they were covered with 2 in. of soil. An application of spores to the soil surface led to 100% infection of the plants. A method is described of isolating *D. lycopersici* from soil heavily infected with other organisms, especially *Penicillium* spp.

## 1965. WILLIAMS, P. H.

*Didymella* stem rot of the tomato.

*A.R. Cheshunt exp. Res. Stat.* 1951, 1952, pp. 85-7.

These "Growers' Notes" on *didymella* stem rot of the tomato summarize 9 years' investigations, accounts of which have appeared in successive Annual Reports. As the most important aspect of control of this fungus

lies in the destruction of all possible sources of infection, the recommendations are confined to sanitary measures, including soil treatment with a 1:16,000 solution of ethyl mercury phosphate at the rate of ½ gal. per sq. yard and sulphur fumigation at the end of the season. Symptoms, other hosts, sources of infection and effect of cultural practices are also discussed.

## 1966. SCHEFFER, R. P., AND WALKER, J. C.

Distribution of fusarium resistance in the tomato plant.

From abstr. in *Phytopathology*, 1952, 42: 474.

Using a cutting inoculation technique, evidence was obtained that resistance to fusarium wilt is not localized in the roots but occurs throughout the plant.

## 1967. DIMOND, A. E., AND WAGGONER, P. E.

The biological activity of mixtures of lycomarasmin and glutamic acid, glutamine, glutathione, or cysteine.

*Science*, 1953, 117: 42-3, bibl. 7.

It has been suggested that lycomarasmin is an active toxin in the wilt of tomatoes caused by *Fusarium oxysporum* f. *lycopersici*. The toxicity to tomato cuttings of lycomarasmin mixed with ferrous or ferric sulphates was not decreased by glutamic acid, glutamine, glutathione or cysteine.

## 1968. WAGGONER, P. E., AND DIMOND, A. E.

Examination of the possibility of therapy of plant disease with ionizing radiation.

*Phytopathology*, 1952, 42: 599-602, bibl. 12.

The sensitivity of *Fusarium oxysporum* f. *lycopersici* and of the tomato plant to ionizing radiation was determined. Since the pathogen is more resistant to ionizing radiation than the host, the prediction that the therapy of fusarium wilt could not be effected with a source of radiation external to the host was verified by experiments using gamma radiation from Co<sup>60</sup>. It was found that the amount of radioactivity arriving at the growing point of a diseased plant was only slightly less than that in a healthy one, so the therapy of fusarium wilt by internal sources of radiation also seems unlikely.—*Conn. agric. Exp. Stat.*

## 1969. FELDMESSER, J.

Root galls of tomato induced by *Heterodera rostochiensis* Woll., the golden nematode.

From abstr. in *Phytopathology*, 1952, 42: 466.

Root galls, induced by *Heterodera rostochiensis*, were found on the roots of potted plants of the tomato variety Bonny Best. This is the first report of root galling caused by this nematode.

## 1970. BERGER, G.

L'érinose bronzée—son traitement. (The control of tomato russet mite.)

*Fruits et Prim.*, 1952, 22: 295-8.

Acaricides that have proved effective for the prevention and control of attacks by *Vasates destructor* on tomatoes in the Casablanca district of Morocco are sulphur or 1% lime-sulphur applied every 15 days and 1% parathion powder. Soil treatment with DD fumigant against eelworm appeared to limit the mite's attacks. Tipping an infested plant hastens its death. New



plantings should not be made in the immediate vicinity of old tomato crops.

1971. DE TELLA, R.

Contribuição para o conhecimento do *Agathomerus sellatus* Germ. (Col., Megalopodidae). (A contribution to knowledge of *Agathomerus sellatus*.)

Rev. Agric. Piracicaba, 1952, 27: 373-6, illus.

The larvae of *Agathomerus sellatus* are stem-borers on tomato and the adults eat the leaves. Recommendations for control are: larvae—destruction of infested branches or plants; adults—hand-picking or spraying. Plants sprayed with bordeaux mixture have been observed to be free from attack.

1972. WILCOX, J., AND HOWLAND, A. F.

Control of a dipterous leaf miner on tomatoes in California.

J. econ. Ent., 1952, 45: 634-9, bibl. 7.

Results of spray and dust applications against a dipterous leaf miner, *Liriomyza* sp., on tomatoes from 1948 to 1951 are summarized. In 1951 dust tests, 5% DDT plus 2% parathion and 5% DDT plus 2% EPN applied at weekly intervals, and 5% aldrin, 2.5% dieldrin and 5% heptachlor applied at 2-week intervals gave the best results. Spray concentrates at 5 gal. per acre applied 4 times at 10-day intervals gave excellent control with DDT plus parathion and metacide, and good control with compounds 711 and 269.

1973. SINGH, K. K., KAPUR, N. S., AND MATHUR, P. B.

Cold storage of brinjals.

Ind. J. Hort., 1952, 9 (1): 16-19, bibl. 1, illus.

Egg plant (*Solanum melongena*) fruits of 45-50 g. stored well for 28 days at 47-50° F. and a relative humidity of 87-90%, but smaller fruits were subject to low temperature injury.

1974. McKEEN, C. D.

*Aphanomyces cladogamus* Drech., a cause of damping-off in peppers and certain other vegetables.

Canad. J. Bot., 1952, 30: 701-9, bibl. 9, illus., being Contr. Div. Bot. Plant Path.

Sci. Serv., Dep. Agric., Ottawa, 1176.

A species of *Aphanomyces* was isolated from damped-off pepper seedlings which had been grown in a sandy loam compost soil under glass. Reduction in stands of pepper seedlings resulted from both pre-emergence and post-emergence damping-off, when seeds were planted in soil inoculated with isolates of the fungus. Characteristic symptoms of post-emergence attacks consisted of black lesions on the hypocotyl frequently extending into the bases of the cotyledons, and death of affected seedlings usually occurred. *A. cladogamus* was found to cause a considerable amount of damping-off in tomato, eggplant, radish, and spinach as well as in pepper. It attacked Spanish onions only slightly, and lettuce, pea, and muskmelon not at all. Hypocotyl and cotyledonary tissues were highly vulnerable. [From author's abstract, see also H.A., 22: 2676.]

1975. DO AMARAL, J. F.

Requeima do pimentão. (Pepper blight.)

Biológico, 1952, 18: 160-1.

Notes are given on the symptoms and control of pepper blight, *Phytophthora capsici*, which was observed for the first time in the State of São Paulo, Brazil, in 1951, where it completely destroyed a crop of 10,000 plants. Among the control measures recommended are the use of clean seed, careful drainage of irrigated fields, rotation of crops, and control sprays of 1% bordeaux mixture every 14 days or preventive sprays every 20 days.

1976. KENDRICK, J. B., JR., AND MIDDLETON, J. T.

Influence of variety, temperature, and fungus strains upon verticillium wilt of pepper.

From abstr. in *Phytopathology*, 1952, 42: 515.

A characteristic symptom of verticillium wilt of pepper, caused by *Verticillium albo-atrum*, is stunting resulting from internode shortening. Among seven varieties studied, Anaheim Chili and Hungarian Paprika showed the greatest injury from infection and Oakview Wonder the least. No commercial variety tested showed sufficient disease tolerance to be grown successfully in infected soil. Optimum temperatures for disease expression were between 25° and 30° C. for all varieties tested. Between 15° and 25° C. severe stunting occurred; at 35° C. only the two most susceptible varieties showed symptoms of moderate severity while other varieties had near normal growth. Isolates of *V. albo-atrum* from 12 different hosts exhibited a range of pathogenicity to pepper, but only the pepper isolate produced severe symptoms.

### Sundry crops.

1977. BUELL, E. P.

The clove bean—*Ipomoea muricata* (Jacq.).

Trop. Agriculturist, 1952, 108: 48-9.

The pedicels become fleshy after the flowers set and make a palatable vegetable when young. A brief account is given of the growing of 2 varieties of the creeper at the Experiment Station, Peradeniya. The yield per plant has been 2-5 lb.

1978. SWAMINATHAN, M., AND MATHUR, P. B.

Singhara (*Trapa bispinosa*).

Indian Fmg, 1952, 2 (8): 20-1, illus.

A short account is given of the cultivation of the crop and the composition of flour made from the "nuts". It is suggested that cultivation, now largely restricted to Kashmir, should be extended to Mysore and other provinces.

### Noted.

1979.

a ALEKSANDROV, S. V.

The use of hybrid seed for increasing cucumber yields in greenhouses. [Russian.]

Sadi Ogorod, 1952, No. 10, pp. 43-5.

b BAKKER, M.

Het kweken van tomatenrassen, resistent tegen de bladvlekkenziekte. (Breeding tomato varieties resistant to leaf mould, *Cladosporium fulvum*.)

Zaadwereld, 1951, 15: 270-1, from English abstr. in *Euphytica*, 1952, 1: 231.

- c BOSWELL, V. R.  
Plant breeding and the vegetable industry.  
*Econ. Bot.*, 1952, 6: 315-41, bibl. 23, illus.
- d CHESHUNT.  
Tomato leaf-miner (*Liriomyxa solani* Her.).  
*A.R. Cheshunt exp. Res. Stat.* 1951, 1952,  
pp. 51-4.  
A biological study.
- e COSTA, A. S.  
Necrose acrópeta do tomateiro, de origem  
genética. (A hereditary acropetal necrosis in  
tomato plants.) [English summary 16 lines.]  
*Bragantia*, 1951, 11: 93-7, illus. [received  
1953].
- f CRANE, M. B.  
Recent experiments in breeding new toma-  
toes.  
*Grower*, 1953, 39: 33-5, illus.  
At John Innes hort. Instn.
- g GAGNEBIN, F.  
La tomate naine canadienne Mendel. (The  
Canadian bush tomato Mendel.)  
*Rev. hort. suisse*, 1952, 25: 393-7, bibl. 2,  
illus.  
For growing under glass in Switzerland.
- h HOWIE, A.  
Carrot growing in the Moray Firth area.  
*Scot. Agric.*, 1952, 32: 132-4.
- i IKUTAKE, M.  
On seed stalk development, flowering and  
fruiting of edible burdocks. [Japanese, with  
English summary  $\frac{1}{2}$  p.]  
*J. hort. Ass. Japan*, 1952, 21: 93-6, bibl. 5.
- j KEMP, G. A.  
Development of earliness in canning toma-  
toes.  
*Rep. Proc. 8th annu. Mtg west. Canad. Soc.*  
*Hort.*, 1952, pp. 78-80, bibl. 10.  
A review of literature.
- k KRICKL, M.  
Winterkohl: Haltbarkeitsprüfung im Ein-  
schlag. (Winter cabbage: testing for keeping  
quality in clamps.)  
*Bodenkultur*, 1951, 2. Sonderheft, being  
*Jb. Bundesanst. Pflb. Wien*, 1950, pp. 290-1,  
bibl. 3.
- l KRUYT, W.  
Effects of some plant growth substances on  
early growth of pea embryos in sterile cul-  
ture; a study in connection with the problem  
of hormonisation of seeds. (Preliminary  
note.)  
Reprinted from *Proc. kon. ned. Akad.*  
*Wetensch. Sci., Ser. C*, 1952, 55: 503-13,  
bibl. 4.
- m MINISTRY OF AGRICULTURE, LONDON.  
Cabbage caterpillars.  
*Adv. Leaf. Minist. Agric. Lond.* 69, revised  
1952, pp. 7, illus., 2d.
- n MINISTRY OF AGRICULTURE, LONDON.  
Onion downy mildew [*Peronospora des-  
tructor*].  
*Adv. Leaf. Minist. Agric. Lond.* 85, revised  
1952, pp. 4, illus.
- o MINISTRY OF AGRICULTURE, LONDON.  
Chafer beetles [*Melolontha* and others].  
*Adv. Leaf. Minist. Agric. Lond.* 235, revised  
1952, pp. 4, illus.
- p MINISTRY OF AGRICULTURE, LONDON.  
Leatherjackets [*Tipula paludosa* and  
others].  
*Adv. Leaf. Minist. Agric. Lond.* 179, 1952,  
pp. 4, illus.
- q MUDRA, A., AND NEUMANN, D.  
Probleme und Ergebnisse der Münche-  
berger Ölkürbiszüchtung. (Problems and  
results of oil pumpkin breeding at Münche-  
berg.)  
*Züchter*, 1952, 22: 99-105, bibl. 11, illus.  
*Cucurbita pepo* var. *oleifera*. See also *H.A.*,  
22: 561.
- r NONNECKE, I. L.  
Some measuring devices used in vegetable  
research.  
*Rep. Proc. 8th annu. Mtg west. Canad. Soc.*  
*Hort.*, 1952, pp. 77-8.  
Viz. penetrometer, texturemeter, refracto-  
meter, colorimeter, hydrometer, scales,  
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Fertilisers for horticultural crops. 8. Man-  
ures for beans. 9. Manures for lettuces.  
10. Manures for onions. 11. Manures for  
rhubarb.  
*Fert. Feed. St. J.*, 1952, 38: 497-8, 527-8,  
607-8, 691-2.  
See also *H.A.*, 22: 3784-6, 3864, 3935q.
- t PILNIK, W., AND ROTHSCHILD, G.  
Studies on the pectase activity of tomatoes.  
*Bull. Res. Coun. Israel*, 1952, 2: 135-7,  
bibl. 8.
- u SASSER, J. N.  
Studies on the control of root-knot nematode  
(*Meloidogyne* spp.) with systox spray  
(E-1059), an organic phosphate insecticide.  
*Plant Dis. Repr.*, 1952, 36: 228-33, bibl. 4,  
illus.  
For previous abstract, see *Phytopathology*,  
1952, 42: 343; *H.A.*, 22: 3924.
- v TAKAHASHI, W. N.  
Rod-shaped virus of radish mosaic.  
*Phytopathology*, 1952, 42: 623-4, bibl. 10,  
illus.
- w TRINIDAD AND TOBAGO.  
Notes on vegetable growing in Trinidad and  
Tobago.  
*Bull. Trinidad Dep. Agric.* 1, 1951, pp. 24  
[received 1953].  
Cultural notes on tropical and temperate  
crops.
- x YOUNG, P. A.  
Curly top virus disease of tomatoes.  
*Proc. 7th Annu. Rio Grande Valley hort.*  
*Inst.*, 1953, pp. 77-8.  
Symptoms, vector and control.



## TOBACCO.

*General.*

(See also 1484, 2218, 2392, 2401, 2402.)

1980. F.A.O.

**Tobacco.**

*Commodity Bull. F.A.O. 20*, 1952, pp. 49, 2s. 6d.

Production of tobacco has increased more than 50% since 1914 whereas the area grown has only increased by 36%. Since 1945 there has been a marked increase in area and production, chiefly in Europe, the Near East, Africa and Latin America, and particularly in cigarette types. Cigar leaf production has been declining gradually since the late 1920s. Cultivation, especially harvesting, is very little mechanized. Europe takes 70% of current exports, which are about 20% of world production. Since 1919 prices have generally increased more than those of other crops. Few other crops are subject to such rigid production and market control. Consumption per head appears to be closely related to national income and in 1950-51 exceeded pre-war consumption with few exceptions. Statistics are given for area, leaf production and yield, trade prices, and production, export and consumption of manufactured tobacco.

1981. VAN LEER, R., AND DORY, J.

La production au Lomami de tabacs de cape de cigare. (Cigar wrapper tobacco growing at Lomami.)

*Bull. agric. Congo belge*, 1952, 43: 999-1010, illus.

An experiment station was founded at Lomami, Katanga, in 1949 to encourage tobacco growing on principles based on accurate research. It is run jointly by INEAC and COBELKAT, the latter being a society for the establishment of Belgian settlers in Katanga. The station is situated at an altitude of 750-1,000 m., and has an annual rainfall of 1,200-1,900 mm. (average 1,522) spread over 8 months. Efforts are at present directed towards the production of high quality Sumatra cigar wrapper tobacco: Colonists dry their own leaf but it is fermented and graded by COBELKAT. Notes are given on the organization of production, which is as yet negligible, and on the role and organization of research.

1982. PIÑERO, M., AND CALDERÓN, J. R.

Costos de producción del tabaco. Zona central este. Puerto Rico, 1948-49. (Tobacco production costs in east central Puerto Rico, 1948-49.) [English summary 2 pp.]

*Bol. Estac. exp. agric. Rio Piedras* 96, 1951, pp. 27 [received 1953].

A study of small-scale tobacco growing (average holding 3 acres) was conducted to provide information to aid in attaining greater efficiency. Human labour was the main item both in nursery and in total cost, being 56 and 54% respectively. Beds shaded with cloth had the following advantages over open beds: (1) higher yield; (2) easier insect and disease control; (3) faster growth; (4) better protection against the weather;

(5) better germination. Yield of dry leaf per unit area increased with the amount of fertilizer applied, and plantings to which an average of 10 cwt./ha. was applied gave the highest profits per cwt. Net profits rose with labour efficiency, measured in terms of cwt. of tobacco produced per man.

1983. (MINISTER OF AGRICULTURE, CANADA.)

**Tobacco research in 1951-52.**

*A.R. Canada Minist. Agric. 1951/2*, pp. 85-7.

*New varieties:* In 1951 the new flue-cured variety Delcrest continued to show superiority over the older varieties in Ontario, was superior to a second new variety, Hicks, but gave a lower yield than the imported Virginia Gold. *Rye in flue-cured rotations:* On the sandy soils of Ontario rye is beneficial in 3-year (rye-rye-tobacco) and 2-year rotations. It affords a valuable soil cover and reduces black root-rot infestation. Its straw can be substituted for farmyard manure which is scarce and costly. *Burley curing:* A new Ca chloride dehydrator showed promise in experiments. Its purpose is to absorb moisture from the air and tobacco at an optimum rate when the R.H. in the curing barn cannot be kept low enough owing to unfavourable weather conditions. Tobacco lost 38% of its original weight in 18 days in the curing compartment with, and 26.4% without, the dehydrator. *Fertilizer practice:* At Delhi over the 5-year period 1946-50 the use of 2-10-8 (compared with 3-10-8) fertilizer at 1,000 lb. per acre increased leaf price by 3.7 c./lb. and consequently acre value by \$69. Band placement of commercial fertilizers increased the acre value of the flue-cured crop by \$30 compared with drilling the fertilizer in the row before transplanting. Fertilizer is now commonly applied 4 in. on either side of the row and about 3 in. deep at transplanting by using an attachment to the planting machine.

1984. CAWTHRON INSTITUTE.

**Tobacco research.**

*A.R. Cawthron Inst., N.Z., 1951/52*, pp. 25-9.

*Diseases:* Black root-rot: In seedling-beds methyl bromide and chloropicrin gave almost 100% control. In heavily infected tobacco gardens the disease was again greatly reduced by dressings of finely ground sulphur at the rate of 10 cwt. per acre. The treatment, however, did not benefit the following year's crop. Verticillium wilt: Chlorobromopropene and finely divided sulphur were promising in the seedbed. Canker: This disease is believed to be due to *Phytophthora parasitica*, but not to the strain that causes black shank in America. *Composition and quality:* With the application of an NPK fertilizer containing 4% N, sugars in the leaf tended to increase with increasing percentages of K. With a 3% N fertilizer the highest sugar content of the leaf was associated with a lower percentage (4%) of K in the NPK fertilizer. At both N levels K uptake was increased by increasing K and P content of the fertilizer. After ryegrass tobacco had a higher sugar content than after other rotation crops. In the case of both high and medium topping a spacing of 4 ft. x 18 in. gave the highest leaf sugar content.

*Varieties.*

1985. MELCHERS, G.  
Mammut-Tabak mit frühreifen Blättern.  
(Mammoth tobacco with early maturing leaves.)  
*Züchter*, 1951, 21: 353-6, bibl. 4, illus.  
[received 1953].

Crosses of the photoperiodically neutral tobacco variety Maryland Mammoth with the short-day Cavalla variety combined a high yield of early maturing leaf with absence of flowers. Further selection of the new form for absence of axillary shoot formation seems promising. Differences in the genetical constitution of the two parent varieties are discussed.—Max Planck Inst. f. Biologie, Tübingen.

1986. CAMUS, G. C., AND WENT, F. W.  
The thermoperiodicity of three varieties of *Nicotiana tabacum*.  
*Amer. J. Bot.*, 1952, 39: 521-8, bibl. 15, illus.

The experimental results reported briefly in 1950 [see *H.A.*, 21: 2748] are given in greater detail.—Earhart Plant Research Laboratory, Pasadena.

1987. COOLHAAS, C.  
Large-scale use of  $F_1$  hybrids in "Vorstenlanden" tobacco. [Dutch summary  $\frac{1}{2}$  p.]  
*Euphytica*, 1952, 1: 3-9.

The methods used for tobacco breeding at the Tobacco Experiment Station at Klaten, Java, and the results obtained there between the years 1925 and 1941 are here described. Many selected strains were lost during the recent Indonesian disturbances, so the importance is stressed of making full use of  $F_1$  hybrids.

1988. ANON.  
Flue-cured tobacco (Kasungu).  
*Nyasaland agric. quart. J.*, 1951 (issued Nov. 1952), 10: 105-7.

In a trial of 9 varieties at Kasungu, Nyasaland, in 1951, Delcrest alone exceeded the three lowest in yield (Duquesne, Bonanza, and White Stem Orinoco) by a significant amount, Yellow Mammoth coming second. It is unlikely that variety will influence yield so much as other factors.

*Seedling production.*

1989. KERR, W. E.  
Tobacco seed germination.  
*Rhod. agric. J.*, 1952, 49: 266-9, bibl. 1.

In laboratory experiments on methods of testing tobacco seed germination, post-harvest dormancy in freshly harvested seed was only overcome successfully by germinating it in strong light or by using a 0.2% solution of potassium nitrate in the presence of a certain amount of light. Germination in diffuse light was slower, and the seedlings were more etiolated, than when seed was sprouted in full light. This suggests that for tobacco seedbeds cheese cloth would be a better covering than grass, unless the latter can be arranged in a very thin, even layer, preferably suspended above the bed.

1990. BAIRD, E. W.  
The production of tobacco seedlings in the Mareeba-Dimbulah district.  
*Qd agric. J.*, 1952, 75: 125-37, illus.

The procedure of preparing the seedbeds for crops to be grown under irrigation or under natural rainfall is described, including a method of sterilizing the soil by burning-over the ground with light bush timber and making use of the central organic material of certain ant-hills. The concrete tray type of seedbed is described in detail.

*Fertilizers.*

1991. CARR, J. M., AND NEAS, I.  
Influence of fertilizer rates on four varieties of flue-cured tobacco.  
*Circ. Ga Exp.-Stat.* 22, 1952, pp. 14.

Four varieties of flue-cured tobacco (400, Gold Dollar, 401 and Virginia Bright) received a 3-10-10 fertilizer at 1,000, 1,400 and 1,800 lb. per acre on damp and dry sandy loams at Tifton, Georgia (average rainfall 1 March to 31 July, 7.01 in.), in experiments lasting from 1943 to 1949. Seasonal differences had more effect on yield and value than had rate of fertilizer and variety. The differences in value per 100 lb. at the 3 fertilizer levels were small, but the yield increases from the additional fertilizer were enough to produce highly significant differences in acre values. Increasing the fertilizer from 1,000 to 1,400 lb. raised the acre value from 823 to 938 points on the accepted rating, whereas the increase from 1,400 to 1,800 raised it only a further 28. Greatest increase in returns was realized from additional fertilizer under conditions in which moisture was not a limiting factor. At the high fertilizer rate there was approximately one week's delay in ripening compared with the low rate. From analysis of the tobacco it appeared that approximately 1,400 lb. per acre was the maximum fertilizer rate at which good quality smoking tobacco could be produced.

1992. PARKER, J. W.  
Flue-cured tobacco fertilizers of the future.  
Reprinted from *Comm. Fert.*, March 1952, in *Bett. Crops*, 1952, 36 (10): 23-6, 40-3, bibl. 6.

The plant-nutrient requirements of flue-cured tobacco, the fertility of soils used for its production, and the composition and quality of fertilizers commonly used are briefly reviewed. Several improved, high analysis fertilizers are suggested as alternatives to the current use of the 3-9-6 grade. The advantages of these fertilizers to growers are discussed.

1993. SWANBACK, T. R., AND ANDERSON, P. J.  
Fertilizer placement for Connecticut tobacco.  
*Bull. Conn. agric. Exp. Stat.* 561, 1952, pp. 10, bibl. 1.

Fertilizer placement experiments conducted at the Tobacco Laboratory Farm, Windsor, during the last 10 years are discussed. The soil is a sandy loam typical of the Connecticut tobacco areas. Havana seed type tobacco was used and a 6-3-6 fertilizer was applied at 3,500 lb. per acre. Plots of  $\frac{1}{10}$  acre were in quadruplicate and randomized on the field. The results were: (1) broadcasting was preferable to drilling in bands close to the row, root injury by the fertilizer concentration being the main objection to the latter method; (2) distributing the fertilizer on the field before ploughing did not give better results than harrowing in after ploughing; (3) placing all the fertilizer on the bottom



of the furrow gave the plants a poor start, stunted them, and resulted in much reduced yield and poorer grading; (4) when one half of the fertilizer was placed on the bottom of the furrow and the other half harrowed in, small increases in yield were obtained.

1994. ANON.

**Dark fired tobacco.**

*Nyasaland agric. quart. J.*, 1951 (issued November 1952), 10: 102-5.

**Fertilizers.** In replicated trials at Lilongwe and Tutchila, Nyasaland, in 1951, N, P and K were used singly and in all combinations. No significant differences in yield or value were recorded for P and K but the results with ammonium sulphate were highly significant for both yield and value at both places. The steady rise in average value per lb. of leaf with increasing applications of N showed that quality improved as well as yield. Taking the cost of ammonium sulphate and its application into consideration it was evident that the limit of economic application was not reached. *Spacing, number of leaves, and N.* In an experiment at Lilongwe in 1951 combining these factors, the spacings utilized were 2, 3 and 4 feet, the number of leaves retained in priming were normal minus 2, normal (9), and normal plus 2, and ammonium sulphate was applied at nil, 100 and 200 lb./acre. Yield and value per acre increased with closer spacing while value per lb. decreased, and there was more disease at 2 ft. Yield per acre increased with more leaves but value per acre remained constant owing to the decreasing value per lb. Yield and value per acre and per lb. all increased with increasing fertilizer. Tentative conclusions are that the case for large quantities of N in the absence of farmyard manure seems well proved, that priming should be fairly drastic, and that it is dangerous to reduce spacing in an effort to increase yield.

1995. SWANBACK, T. R.

**The nitrogen fertilization of Connecticut tobacco.**

*Bull. Conn. agric. Exp. Stat.* 559, 1952, pp. 23, bibl. 50.

In the work on soil-nitrogen relationship, a major feature was the study of ammonification and nitrification of nitrogenous materials and their effects on soil reaction. The acid soil reaction required for optimum growth of tobacco, restricted to an upper pH limit of 5.5-5.6 because of black rootrot, was found to be satisfactory for nitrification when small and frequent additions of lime were made to maintain the pH at this level. Nitrate nitrogen was found preferable to ammonia nitrogen. Oil seed meals gave the highest production of nitrates, reflected in optimum growth of tobacco. Lysimeter studies showed that in seasons of excessive rainfall as much as 100 lb. of cottonseed meal nitrogen was leached from the soil as against 60 lb. in years of normal precipitation. Results from irrigation experiments showed that as much as 40% more nitrate nitrogen was produced on irrigated than on non-irrigated land. Calcium in the leaf increased with increasing supply of soil nitrogen up to 250 lb. per acre but decreased at 300 lb. of N to the acre. Nicotine content of the leaf increased with an increase in the amount of ammonium nitrogen absorbed by the plant. Distribution of nitrogen compounds in the tobacco plant varied with position on the stalk and maturity

of leaves. Excessive amounts of nitrogen in tobacco leaves retarded burn. Nitrogen was deposited in the leaf somewhat in proportion to nitrogen supplied in the soil. Magnesia increased in the leaf with increased fertilizer nitrogen, while potash was almost unaffected by nitrogen. Old process cottonseed meal, considered a "standard" source of nitrogen, was used as a measure to evaluate other nitrogenous materials investigated. Nitrate of soda nitrogen was comparable to organic nitrogen in its effect on yield and grading, if the total N requirement was divided and applied at intervals. Urea nitrogen could be used instead of 25 to 50% of the oil seed meal nitrogen without impairing quality of stalk-cut tobacco. A new synthetic nitrogenous material, ureaform, a chemical mixture of urea and formaldehyde, gave promising results when it was used to supply 25% of the required nitrogen, the balance coming from cottonseed meal. Ammonium nitrate, cal-nitro and ammonium sulphate could all be used as part substitutes for oil seed meals. Ammonium sulphate proved an excellent soil acidifier.

1996. WOLTZ, W. G.

**Sources of nitrogen in crop production. Sources of nitrogen for flue-cured tobacco plant beds.**

*Tech. Bull. N.C. agric. Exp. Stat.* 96, 1952, pp. 26-32, bibl. 1.

Replicated experiments were conducted in 1947 and 1948 at several North Carolina experiment stations to study the effect of N from various sources on tobacco seedlings growing on sandy loams, mainly of low fertility. Tests were made at 3 levels, viz. nil, 3% and 6% N. The fertilizers were (1) ammonium nitrate, (2)  $\frac{1}{2}$  cottonseed meal and  $\frac{1}{2}$  ammonium nitrate, (3)  $\frac{1}{2}$  cottonseed meal and  $\frac{1}{2}$  ammonium nitrate, (4) Na nitrate, and (5) urea. These were prepared in mixtures containing 9%  $P_2O_5$  from superphosphate, 3%  $K_2O$  from K sulphate and 1% MgO from Epsom salts, and were all applied at the rate of 1 lb. per sq. yd. Herbicide, consisting of 1 lb. Uramon and  $\frac{1}{2}$  lb. Cyanamide per sq. yd, was applied in the autumn about 3 months before seeding. Detailed results are given and data are presented which show the effect of N from fertilizer and herbicide upon plant stand and number of transplantable plants per sq. yd of bed and upon total N uptake. The results were: (1) herbicide generally met the full N needs of the tobacco plants and yielded more transplantable plants than any of the fertilizer treatments without herbicidal treatment; (2) Na nitrate was not a good source of N; (3) urea was the best source on beds not treated with herbicide; (4) cottonseed meal mixtures applied after herbicide generally decreased plant stand and number of transplantable plants. Brief notes are also given on two earlier experiments in Georgia and South Carolina.

1997. TISDALE, S. L., WOLTZ, W. G., AND CARR, J. M.

**Sources of nitrogen in crop production. Sources of nitrogen for flue-cured tobacco.**

*Tech. Bull. N.C. agric. Exp. Stat.* 96, 1952, pp. 33-42, bibl. 3.

Experimental data from Georgia, Virginia and North Carolina are examined in relation to the belief widely held among local growers that flue-cured tobacco requires special types of N fertilizers, in particular

expensive natural organic materials. It is concluded that there is little difference between the effects of the various sources of N, and that cottonseed meal alone or in mixture is not superior to chemical sources, while process tankage alone or in mixture with ammonium nitrate is inferior.

1998. KOMATSU, N.

**Effects of varied amounts of phosphate fertilizer on the growth of bright leaf tobacco.**

[Japanese, with English summary.]

*J. Sci. Soil Man. Japan*, 1952, 22: 257-63, from abstr. in *Soils and Ferts*, 1953, 16, No. 305.

P fertilizer increased yield of dry matter and the rate of P absorption by the plant with dressings of up to 60 kg./acre of  $P_2O_5$ ; with larger dressings yield and absorption decreased. The N content of plants receiving no P was slightly higher than that of plants receiving P, but there was no marked difference in protein N or nicotine content. P application caused leaves to mature early. P applied to the row before transplanting gave higher yield and lower P content in early growth than did P side-dressed 30 days after transplanting. Leaves matured later when P was applied before planting.

1999. KAKAHASHI, T., AND YOSHIDA, D.

**Studies on the potash nutrition of yellow tobacco. 3. Relationship of form of nitrogen and potash levels in culture solution.** [Japanese, with English summary.]

*J. Sci. Soil Man. Japan*, 1952, 22: 288-92, from abstr. in *Soils and Ferts*, 1953, 16, No. 304.

Plant growth was much better with nitrate than with ammonium N. K-deficiency symptoms were seen in all K treatments with ammonium N, but the P and Cl content of the crop was higher than in the nitrate series; Cu and Mg contents were higher with nitrate. P content was not affected by increasing K concentration in both series, but Cl content increased with increasing K concentration.

2000. McMURTREY, J. E., JR.

**Deficiencies of secondary and micro-nutrient elements in plants.**

*Bett. Crops*, 1952, 36 (9): 19-26, 42-8, bibl. 80, illus.

A condensed but comprehensive review of Ca, S, Mg, and B, Cu, Fe, Mn, Mo and Zn deficiency diseases, chiefly of tobacco. The effects of nutrient shortages are clearly illustrated by photographs.

### *Cultural practice.*

2001. STEINBERG, R. A.

**Premature blossoming: effects of vernalization, seedling age and environment on subsequent growth and flowering of transplanted tobacco.**

*Plant Physiol.*, 1952, 27: 745-53, bibl. 1.

The phenomenon of premature blossoming (arrested vegetative growth and concomitant flowering) of tobacco when transplanted from seedbed to field was duplicated under greenhouse conditions. A study was made on the effect of seed vernalization and environmental growth conditions before transplanting of seedlings on the subsequent time required for flowering,

height at flowering, and total number of leaves formed. The flue-cured varieties Gold Dollar and 402 were used. The minimal number of days from sowing to flowering in the greenhouse was 83 for the Gold Dollar and 87 for the 402 variety. These values were approached only when seedlings of minimal age were transplanted. Plants grown in the field exhibited retarded development since they required 140 to 170 days from sowing to flowering. With increasing age of seedlings used for transplanting, the subsequent time required for flowering, height, and number of nodes at flowering decreased at first but later increased. In experiments continuing into the summer these trends were minimized or even reversed (height and leaves formed before flowering). Low temperatures during the seedling stage intensified these trends. Vernalization of seed and soil moisture content had no effect. Premature blossoming in field tobacco, it is surmised, could be minimized by the use of higher temperatures and the later sowing of seed, both tending to decrease age of seedlings when of a size suitable for transplanting. High temperatures during the seedling stage also increased average number of leaves formed per plant by about 20% with both varieties. [Author's summary.]—Plant Industry Station, Beltsville, Maryland.

2002. MARCHAND, J.-D.

**L'irrigation dans la culture du tabac jaune au Québec. (Irrigation of yellow tobacco in Quebec.)**

*Rev. d'Oka*, 1952, 26: 129-41, bibl. 23.

The crop is grown on poor sandy soils and sometimes suffers from summer drought although the annual rainfall is normally well distributed. Irrigation is being increasingly practised and the rotary sprinkler system is the commonest and most successful. Large plantations require a pump with a capacity of 380 gal. per minute and small ones 180. An application of 1 inch of water per acre moistens 6 inches of soil and this is sufficient. A single application is enough for a normal dry period but a second is required if the drought is prolonged. The crop requires ample water on planting out, but, when established, at least 2 weeks of dryness are necessary to stimulate root development so that prolonged summer droughts can be withstood without the rate of growth slackening. Irrigation is required: (1) shortly after the second weeding if there has been a 2-3 weeks' drought; (2) several days before or immediately after topping if there has been no rain for 12-15 days, to prevent scalding and to stimulate growth and maturation; (3) immediately after disbudding in the middle of the harvest, if there has been little or no rain for 12-15 days, to stimulate maturation of the leaves.

2003. HANEY, T. G.

**The prevention of sucker growth of tobacco after topping. Experiments with mineral oils.**

*J. Agric. W. Aust.*, 1952, 1 (n.s.): 571-4.

Preliminary trials have shown that the application of a mixture of equal quantities of Vacuum White Oil No. 4 and liquid paraffin to the cut surface of tobacco stems after topping reduced the dry weight of suckers produced. Further investigations will be undertaken to test a device which tops the plants and automatically applies the oil at the same time.—Manjimup Tobacco Research Station.



2004. KADAM, B. S., KHEMCHANDANI, H. T., AND KRISHNAN, A. S.

**Effect of topping and spacing on the yield of chewing tobacco.**

*Indian Tobacco*, 1952, 2: 123-31, bibl. 12.

The local variety Valmonnai (Oosimonnai) was employed in replicated experiments at the Vedsandur Cigar and Cheroot Tobacco Research Station, Madras, in 1948-51. Spacings were 30×24 in. (8,712 per acre), 30×27 (7,744), 30×31 (6,745) and 30×36 (5,808); and topping was at 8, 10, 12, 14 and 16 leaves from the base. Closer spacing gave higher yields, the weights of cured leaf in lb. per acre for the different intervals being 1,728, 1,702, 1,540 and 1,518 respectively. Topping at 14 leaves gave a yield of 1,747 lb. cured leaf per acre, which was significantly higher than the yields at 8 (1,398 lb.), 10 (1,502) and 12 (1,662). Topping at 16 leaves lowered the quality of the leaf, though the yield was higher than at 14 leaves. With adequate fertilization the yields of irrigated chewing tobacco can be considerably raised without loss of quality by adopting a spacing of 30×24 in., and by topping at 14 leaves from the ground.

*Diseases and pests.*

(See also 1754e, 1839.)

2005. (I.N.E.A.C.)

**Maladies et ennemis du tabac. (Diseases and pests of tobacco.)**

*Rapp. annu. I.N.E.A.C.*, 1952, pp. 132-6.

The following experiments were undertaken at Kaniama laboratory, Belgian Congo. *Susceptibility to Heterodera marioni*: Among the least susceptible of 23 tobacco varieties tested were Sumatra and Havana 307; T.I.706 was heavily attacked. *Residual effect of D-D fumigation* was clearly observable 8 months after treatment. *Cercospora foliar necrosis* experiments in 1950-51 and 1951-52 showed that Burley varieties were very susceptible, flue-cured varieties intermediate and cigar wrapper varieties resistant. *Cercospora leafspot control*: Of 7 fungicides tried the 3 best were 70% ferric dimethyl dithiocarbamate, 65% zinc dimethyl dithiocarbamate, and yellow cuprocide (containing 80% cuprous oxide); all were applied at 25 g. in 5 l. for 160 plants, or about 600 l. per ha. *Aphis control*: 5 spray and 2 dust treatments were applied and after 7 days the plants that had received the dusting treatments were the cleanest, viz. 1% parathion dust at 20 kg. per ha. (12.7 live aphides per sample), parathion-tobacco (a mixture of Thiophos wettable powder 15 and tobacco powder giving a final concentration of 2% pure parathion) (20.5 live aphides per sample), compared with 104.5 live aphides per sample in the control. The best of the sprays was Thiophos W.P.15 at 40 g. per 20 l. water (27 live aphides). *Control of termites attacking the stem*: Neither chloropicrin nor DDT had any effect on the termites, but the former stimulated the growth of the tobacco.

2006. COHEN, M., AND SIEGEL, A.

**A quantitative electrophoretic study of competition between two strains of tobacco mosaic virus. II. The physiological age of the leaf as a factor in strain competition in the inoculated leaf.**

Abstr. in *Phytopathology*, 1952, 42: 464.

Electrophoretic analyses of virus strain mixtures extracted and purified from tobacco leaves previously inoculated with a 50-50 mixture of purified common and mild TMV strains indicate that the physiological condition of the leaf at the time of inoculation influences the degree to which the common strain predominates over the mild strain in those leaves. A single leaf in each of a series of comparable greenhouse-grown tobacco plants about 18 inches tall was inoculated with the 50-50 strain mixture. Four weeks later, the virus strain mixture extracts of these leaves, which, at the time of inoculation were (1) mature, (2) expanding and of medium size, and (3) about half an inch in length, were found to contain, respectively, about 35 to 50, 20 to 30, and 0% mild.

2007. DAVIS, D.

**Chemotherapy of tobacco mosaic virus.**

From abstr. in *Phytopathology*, 1952, 42: 465.

The resistance of *Nicotiana glutinosa* to TMV was increased with high significance by 10 daily soil applications of 50 ml. of 16 p.p.m. 4-chloro-3,5-dimethyl-phenoxyethanol (1182). The number of local lesions per unit area or per leaf in 1182-treated plants was reduced to approximately  $\frac{1}{3}$  of the check. This change in susceptibility was independent of leaf age and concentration of virus inoculum. TMV was not inactivated *in vitro* when subjected to 1182 at 200 p.p.m. for 5 days at room temperature. The failure of 1182 to inactivate TMV *in vitro* suggests that the alteration in susceptibility to TMV was caused by a modification of the host's metabolism.

2008. NICHOLS, C. W.

**The retarding effects of certain plant hormones on tobacco mosaic symptoms.**

*Phytopathology*, 1952, 42: 579-80, bibl. 3.

**The inhibition of tobacco mosaic symptoms by application of certain plant hormones.**

Abstr. in *Phytopathology*, 1952, 42: 517.

Young tobacco plants were sprayed daily with aqueous solutions of naphthaleneacetic acid at a concentration of 10 mg./l. and indolebutyric acid at concentrations of 100 and 500 mg./l. Control plants were sprayed with distilled water. The naphthaleneacetic acid-sprayed plants developed tobacco mosaic symptoms 12 to 17 days after inoculation, the indolebutyric acid-sprayed plants in 5 to 9 days. Symptoms were milder on the hormone-sprayed plants than on the water-sprayed plants. The plants treated with naphthaleneacetic acid (10 mg./l.) and with indolebutyric acid (500 mg./l.) were considerably stunted. Blister-like swellings on the stems and petioles and varying amounts of downward rolling of the leaves occurred on plants treated with both compounds. Fresh weights of the tops of healthy and infected plants sprayed with indolebutyric acid at a concentration of 100 mg./l. were slightly higher than those of corresponding distilled water-sprayed plants.—Univ. Calif.

2009. WEATHERS, L. G., AND POUND, G. S.

**Relation of host nutrition to the concentration of turnip virus 1 in *Nicotiana glutinosa* L. and *N. multivalvis* L.**

From abstr. in *Phytopathology*, 1952, 42: 477.

Concentrations of turnip virus 1 in expressed extracts

of plants of *Nicotiana glutinosa* and *N. multivalvis* varied under different levels of nitrogen, phosphorus, potassium, and balanced Hoagland's solution in quartz sand. In general the effects on virus concentration closely paralleled those on host growth.

2010. CETAS, R. C., AND ROSS, A. F.  
**Root necrosis virus of *Nicotiana glutinosa*.**  
 From abstr. in *Phytopathology*, 1952, **42**: 464.

The symptoms caused by a previously undescribed virus in *N. glutinosa* are described. It produced no visible symptoms in Turkish tobacco and several other plants, but infected *N. repanda* and 2 *Physalis* spp. In juice from infected plants of *N. glutinosa* the virus was inactivated in 10 mins. at 50° C. but not at 40° C. The dilution end-point was between 1: 100 and 1: 500. No evidence of cross-protection was obtained between this virus and potato viruses A, X and Y.

2011. SUHOV, K. S.  
**A virus causing chlorosis of the upper leaves of mahorka.** [Russian.]  
*Doklady Akad. Nauk S.S.S.R.*, 1952, **85**: 1381-2, bibl. 2, illus.

An infectious chlorosis found in the upper leaves of mahorka [*Nicotiana rustica*], and starting as pale necrotic spots, is described. When an electron microscope is used, the spots are found to contain particles resembling those of a virus, and vacuolar inclusions are found in the cells of hairs on affected leaves. A comparison is made between this virus and that of tomato spotted wilt.

2012. POWERS, H. R., JR.  
**The cause of wilting in tobacco plants affected by black shank.**  
 From abstr. in *Phytopathology*, 1952, **42**: 472-3.

Physiological studies of tobacco plants affected by black shank (*Phytophthora parasitica* var. *nicotianae*) indicate that wilting is a result of a localized disruption of water movement within the area of the stem lesion, rather than the systemic action of toxic substances. Wilted plants recovered turgor when water was introduced into the stem above the lesion, but not when water was supplied below the infection site.

2013. MARCELLI, E.  
 Ultimi risultati nella lotta contro l'oidio del tabacco (*Erysiphe cichoracearum*). (Recent results in the control of tobacco powdery mildew.) [English summary 4 lines.]  
*Not. Mal. Piante*, 1952, No. 20, pp. 18-22, bibl. 11, and *Tabacco*, 1952, **56**: 370-4, bibl. 10.

In tests for the control of tobacco powdery mildew (*Erysiphe cichoracearum*) good results were obtained with salicylaldehyde 0.4% and tetramethylthiuram-disulphate [TMD], the former being superior, the latter inferior, to sulphur on the leaves. Sodium salicylate and potassium permanganate were phytotoxic. No control was obtained by applying sulphur to the soil.

2014. LOWNSEBURY, B. F.  
**Host preferences of the recently discovered tobacco cyst nematode, *Heterodera* sp.**  
 From abstr. in *Phytopathology*, 1952, **42**: 469.

In September, 1951, a new cyst-forming nematode was found on tobacco in Connecticut. Reproduction of the tobacco cyst nematode occurs consistently on several tobacco varieties and less readily on tomato. Second stage larvae will attack potato lightly, but examination of stained roots has revealed no maturation in potatoes. Differences in host preference indicate at least an intra-species difference between the tobacco cyst nematode and the golden nematode, *H. rostochiensis*.

2015. DAULTON, R. A. C., AND STOKES, W. M.  
**The destruction or inhibition of root-knot nematodes by exposure to an electrostatic field.**  
*Emp. J. exp. Agric.*, 1952, **20**: 271-3.

Equipment is described which was successfully used in field and other tests to destroy root-knot nematodes, *Meloidogyne* spp., in dry soil, damp soil and water by subjecting them to a pulsating electrostatic field set up by a simple induction coil across suitably spaced electrodes. In soil nematodes were destroyed to a depth of 24 in. over a track width of 36 in. The treatment had no adverse effect on the germination of tobacco seed or on growing tobacco plants.—*Tobacco Res. Stat.*, Trelawney, S. Rhod.

2016. LOETERS, J. W., AND STAM, J. C.  
 Het steriliseren van zaadbedden voor tabak volgens een vereenvoudigde methode. (A simplified method of sterilizing tobacco seedbeds.) [English summary ¼ p.]  
*Meded. Dir. Tuinb.*, 1952, **15**: 811-15, bibl. 3, illus.

A cheap, simple method of steaming soil for tobacco seedbeds is described. A fire is made in a trench 40-50 cm. deep which is covered with an iron sheet. The soil to be steamed is placed on the sheet to a depth of 10 cm., and is heavily watered and constantly stirred during the steaming process. The steaming should be continued for 15-20 minutes. In trials carried out in Holland, seed sown in soil steamed in this way germinated much better than that sown in untreated soil, the growth of the seedlings was better, weed growth was less and damage by virus diseases, slugs and snails was markedly reduced.

2017. SHEPHERD, C. J.  
**Tainting of tobacco by a dichloropropene-dichloropropane soil fumigant.**  
*Nature*, 1952, **170**: 1073-4, bibl. 1.

In Southern Rhodesia control of the celworm, *Heterodera marioni*, in tobacco is effected by soil injections of ethylene dibromide or a dichloropropene-dichloropropane mixture. During the 1951-52 growing season, it has been estimated that the latter fumigant has produced off-odours in approximately 5% of the crop. These odours first become apparent during the curing process, and they persist throughout all subsequent stages of processing. Impurities in the fumigant have been shown to be responsible for this tainting and have been isolated and identified by methods described.—*Tobacco Pest Control Research Scheme*, Salisbury.

2018. TIRELLI, M.  
 Trattamenti al tabacco con insetticidi sistemici. (Treatment of tobacco with systemic insecticides.)  
*Tabacco*, 1952, **56**: 355-61, illus.



In pot experiments with Pestox 66 (octamethylpyrophosphoramidate), watering the soil appeared more efficacious than spraying the plant. A concentration of 1.5% was adequate for soil application and toxicity thus conferred on the plant lasted at least 4 weeks. Translocation from treated to untreated leaves took 4 days. Aphids that sucked toxic sap took at least a day to die. Experiments in the practical use of systemic insecticides are taking place.

2019. PERUCCI, E.

La lotta contro gli afidi nelle piante di tabacco con insetticidi sistemici. (The control of aphids on tobacco plants with systemic insecticides.)

*Tabacco*, 1952, 56: 362-9.

In experiments at Verona in 1952, Pestox 66 (octamethylpyrophosphoramidate) and systox (thioglycol-phosphoric ester) at various concentrations were applied in 3 different ways to tobacco plants raised under gauze: (1) spraying the whole plant; (2) spraying the lower part of the plant; and (3) soil application at the base of the plant. The first two methods were not efficacious, but complete control was obtained by the soil application of 0.3% pestox or 0.1% systox at  $\frac{1}{5}$ - $\frac{1}{4}$  l. per plant. The toxicity period was 15 days for pestox and 25 for systox and it is probable that, at least for tobaccos with a short vegetative cycle, a single annual treatment would normally be enough. The insecticide should be applied immediately after the first appearance of the aphids.

#### Curing.

2020. GIOVANNONZI, M.

Studi sulla fermentazione dei tabacchi. XIV nota—Su di una possibile causa capace di determinare un aspetto fermentativo del tabacco. (Studies on the fermentation of tobacco. Note 14. A possible determining factor in tobacco fermentation.)

*Tabacco*, 1952, 56: 227-45, bibl. 1, illus.

The subject of this paper is the property possessed by colloids of generating heat during the absorption of moisture.

2021. PACK, A. B., AND JUNNILA, W. A.

Principles of curing broadleaf and Havana seed tobaccos. I. General principles of curing. II. The principles of curing with LP-gas.

*Circ. Conn. agric. Exp. Stat.* 183, 1952, pp. 27, bibl. 9, illus.

An account of the general principles of tobacco curing is followed by an illustrated description of equipment needed for the new technique of curing by LP-gas (liquified petroleum) fires. The saving achieved by this method is calculated.

#### Noted.

2022.

a COCKBILL, G. F.

The root knot eelworm.

*Rhod. agric. J.*, 1952, 49: 303-12, bibl. 10. Life history, host plants and control of *Meloidogyne* spp. reviewed.

b CURCIO, M.

I fattori di produzione del tabacco. (Factors in the production of tobacco.)

*Tabacco*, 1952, 56: 246-60. Heredity and environment.

c HOUSTON, F. G.

Separation and determination of nicotine and nornicotine in tobacco.

*Analyt. Chem.*, 1952, 24: 1831-2, bibl. 5.

d PERDOMO, J. E.

La riqueza tabacalera Cubana. (The Cuban tobacco industry.)

*Rev. Agric., Habana*, 1951/52, 35 (1): 156-66, illus.

History, areas of production and trade.

e POGLIAGA, H. H.

Híbrido intergenérico *Nicotiana* × *Petunia*. (A *Nicotiana* × *Petunia* hybrid.)

*Idia*, 1952, 5 (57): 16.

*Nicotiana tabacum* × *Petunia parodii*.

f SCHLEGAL, D. E., DELWICHE, C. C., AND GOLD, A. H.

Effect of radioactive phosphorus on symptoms and virus content of mosaic tobacco plants.

From abstr. in *Phytopathology*, 1952, 42: 519.

g SCHNEIDER, I. R.

Solution of tobacco mosaic virus in the aqueous phase of a chloroform-water emulsion and application of this phenomenon in virus assay.

*Science*, 1953, 117: 30-1, bibl. 7.

## MISCELLANEOUS TEMPERATE AND TROPICAL PLANTS.

### Drug plants.

(See also 2040, 2067g, h, u.)

2023. BOSS, G.

Der Einfluss von Klima und Witterung auf den Wirkstoffgehalt von Drogen. (The influence of climate and weather on the active substance content of drug plants.)

*Ber. dtsh. Wetterdienst. U.S. Zone* 42, 1952, pp. 394-5.

The relationship between sunshine and active substance

content in *Digitalis lanata* and other medicinal plants is discussed.

2024. VAN SLUIS, K. J. H.

Drug plant cultivation in the Netherlands.

*World Crops*, 1953, 5: 65-7.

This industry has recently assumed some importance in Holland. Notes are given on the cultivation of *Achillea millefolium*, *Althaea officinalis*, *Atropa belladonna*, *Calendula officinalis*, *Datura stramonium inermis*, *Digitalis lanata*, *D. purpurea*, *Hyoscyamus niger annuus*,

*H. niger biennis*, *Lobelia inflata*, *Rheum palmatum* [see also *H.A.*, 22: 1698].

2025. JAYAWEEA, D. M. A.

**Drug plants (indigenous and exotic) that can be grown in Ceylon. Part II.\***

*Trop. Agriculturist*, 1952, 108: 109-15, bibl. 13.

Short descriptions are given of the plant and the history, composition and uses of the drug in relation to the following: Balsam of Peru from *Myroxylon pereirae*, balsam of Tolu from *M. toluiferum*, bassia from 3 *Bassia* spp., bael from *Aegle marmelos*, benzoin from *Styrax benzoin*, berberis from *Berberis aristata*, betel from *Piper betle*, bixa from *Bixa orellana*, and butea gum and seed from *Butea frondosa*.

2026. SUBBARATNAM, A. V.

**Alkaloidal constituents of *Gloriosa superba* Linn.**

*J. sci. industr. Res., India*, 1952, 11B: 446-7, bibl. 7.

Colchicine and a related new alkaloid provisionally named gloriosine have been found in the dried tubers of *Gloriosa superba*, which is under investigation as a possible source of colchicine. Further work is in progress.—Nat. chem. Lab., Poona.

2027. WILSON, P. M. W.

**Distribution of "solanaceous" alkaloids in some new graft combinations.**

*New Phytol.*, 1952, 51: 260-2, bibl. 9.

The grafting technique was used to study "solanaceous" alkaloids in *Hyoscyamus niger*, *H. muticus* and *Scopolia anomala*. Alkaloids were received by scions of *Physalis alkekengi*, potato or tomato when grafted on stocks of these species, but the reciprocal grafts were alkaloid-free.

2028. JAMES, G. M., AND THEWLIS, B. H.

**The separation and identification of solanaceous alkaloids from normal and grafted plants.**

*New Phytol.*, 1952, 51: 250-5, bibl. 10.

A method is described in which the analytical methods of Evans and Partridge are adapted for use with plant materials. Using this method, hyoscyne/hyoscyamine ratios of *Atropa belladonna* and *Datura innoxia* are shown to be reasonably constant and very distinct. The ratios in grafted plants are shown to be those characteristic of the stock used, not those characteristic of the normal plants of the scion species. It is shown that starvation and ageing do not cause variations in the ratios characteristic of the species. The bearing of these facts on the formation and distribution of alkaloids in these plants is discussed. [Authors' summary.]

2029. GRÜMMER, G.

**Beiträge zur Eigenschaftsanalyse der Anfälligkeit von *Papaver somniferum* gegen *Helminthosporium papaveris*. (The susceptibility of *Papaver somniferum* to *Helminthosporium papaveris*.)**

*Züchter*, 1951, 21: 306-22, bibl. 67 [received 1953].

Inoculation experiments on cut leaves and whole plants in pot cultures showed that infection depends on the host's physiological predisposition. This predisposition is manifested in chlorosis or in abnormal metabolism that may lead to chlorosis. The metabolic products of the fungus were shown to contain substances toxic to *Papaver* spp. and to members of other plant families. The action of the toxin on the water balance of tomato shoots is compared with Gäumann's findings on lycopersin wilt. Other subjects discussed include the relationship between toxin action and chlorosis of tomato shoots, the inactivation of the toxin by oxidation and the question of immunity and resistance to *H. papaveris*.—Jena Univ.

2030. CHATTERJEE, R.

**Indian podophyllum.**

*Econ. Bot.*, 1952, 6: 342-54, bibl. 6, illus.

The rhizomes and roots of *Podophyllum* spp. contain a resin used as purgative. The active principle is podophylloresin, while a more toxic substance found with it is called podophyllotoxin. The species found in India are *P. emodi* and its varieties, and *P. sikkimensis*. Wild plants form the main source of supply, though podophyllum can be cultivated, in which case it is propagated either from seed or from sections of rhizomes.

2031. BUSH, I. E., AND TAYLOR, D. A. H.

**The paper-chromatographic examination of the cardiac aglycones of *Strophanthus* seeds.**

*Biochem. J.*, 1952, 52: 643-8, bibl. 30.

A paper-chromatographic method for the identification of cardiac aglycones has been devised and applied to samples of seeds from many *Strophanthus* species. A classification of the genus on purely chemical grounds is proposed.

### Essential oils.

(See also 2067b, c, e, i.)

2032. NAVES, Y. R.

**Production and analysis of Brazilian rosewood oil.**

*Perfum. essent. Oil Rec.*, 1952, 43: 316-20, 346, illus., from abstr. in *DocumBl. trop. Prod. Amst.*, 1952, 7: 775.

An account is given of the extraction, preparation and composition of Brazilian rosewood oil from *Aniba rosaedora* var. *amazonica*, and the systematics of the species are dealt with. [See also *H.A.*, 23: 916.]

2033. HORNER, C. E.

**Root and rhizome rot of peppermint.**

From abstr. in *Phytopathology*, 1952, 42: 514-15.

A root and rhizome rot of peppermint in western Oregon is caused by a complex of fungi—*Rhizoctonia solani*, *Fusarium roseum*, *Fusarium* sp. and *Pythium* sp. Autumn ploughed mint produced stronger stands than mint spring ploughed where root rot was severe. Autumn ploughing resulted in sufficient new shoots becoming established before the parent rhizomes rotted away.

\* For Part I, see *H.A.*, 16: 2226.



2034. PORTER, C. L., AND HIMELICK, E.  
**Production of disease-free planting stock of *Mentha piperita* L.**  
 From abstr. in *Phytopathology*, 1952, 42: 472.

In tests with peppermint rhizomes, using temperatures lethal to *Verticillium albo-atrum*, an exposure to 47° C. for 55 min., or to 48° C. for 35 min. gave the greatest percentage of viable disease-free rhizomes.

2035. BROWN, E., AND MATTHEWS, W. S. A.  
**Basil oil from Tanganyika.**  
*Colon. Plant Anim. Prod.*, 1952/53, 3: 57-60.

The analytical constants of oil distilled from immature inflorescences of *Ocimum basilicum* are compared with commercial samples of basil oil from France and Réunion.

2036. MUSGRAVE, O. C., STARK, J., AND SPRING, F. S.  
**Non-saponifiable constituents of Spanish broom.**  
*J. chem. Soc. Lond.*, 1952, pp. 4393-7, bibl. 7.

In extracts of Spanish broom (*Spartium junceum*), which are widely used in the French perfume industry, the following constituents were identified in the non-saponifiable material: a mixture of higher paraffins, a mixture of higher aliphatic alcohols,  $\alpha$ -,  $\beta$ -, and  $\delta$ -amyrin, lupeol,  $\beta$ -sitosterol, *n*-octadecane-1: 18-diol, and *n*-hexacosane-1: 26-diol. In addition, two unidentified alcohols have been isolated.—Royal Tech. College, Glasgow.

### Fibres.

(See also 20671.)

2037. RABECHAU, —.  
**La ramie. (Ramie.)**  
*Rev. int. Prod. colon.*, 1952, 27: 151, 153-6, 159, from abstr. in *DocumBl. trop. Prod. Amst.*, 1952, 7: 806.

Data are given on the morphology and taxonomy of ramie with a view to selection. Varietal characters are considerably affected by external environmental conditions. Selection offers great possibilities as a result of the marked variability of biotypes.

2038. MEDINA, J. C.  
 Efeito da frequência e severidade de corte das folhas sobre a duração de vida do sisal.  
 (The effect on the length of the life of sisal of the frequency and intensity of harvesting the leaves. [English summary 5 lines.]  
*Bragantia*, 1951, 11: 19-22, bibl. 2 [received 1953].

In experiments begun in 1943 at the Central Experimental Station, Campinas, Brazil, there were 4 randomized blocks, each of 4 plots, each subdivided into 3 split plots, each containing 12 plants at 2.5×1.5 m. in 2 rows. The 12 treatments were 3-, 6-, 9- and 12-monthly cuts each at 30, 60 and 90% intensity. On the basis of the number of plants that had flowered up to the time they had reached 85 months old it was concluded that the more frequent and the more severe the harvesting was, the longer would the life of the plants be. After 85 months the numbers of plants that had flowered under 30, 60 and 90% cutting intensity at 3-,

6-, 9- and 12-monthly intervals were: 15, 1, 0; 37, 12, 3; 18, 20, 6; and 42, 23, 13.

2039. COURY, T.  
 Em torno da questão "deficiências minerais em sisal e a necrose da base das folhas".  
 (Mineral deficiencies and banding disease in sisal.)  
*An. Esc. sup. Agric. "Luiz de Queiroz" Piracicaba*, 1951, 8: 387-98, bibl. 15, illus. [received 1953].

Two experiments are described which show that, contrary to the opinion of Alvim [see *H.A.*, 21: 3024, where for "manganese" read "magnesium"], K deficiency is the cause of banding disease. In the first, four 50-plant plots received, in addition to NP, the following treatments: (1) 100 g. Mg sulphate per plant; (2) 50 g. Mg sulphate; (3) nil-control; and (4) pure K sulphate. Two applications were made, one in the dry season and the other after the first rains. Symptoms of banding disease occurred in the Mg plots and even in the control but not in the K sulphate plot. In the other experiment, the following 9 treatments were given: (1) NPKCa, (2) NPK, (3) NP, (4) NK, (5) NCa, (6) PCa, (7) NPKCaMg, (8) Ca, (9) nil. The results were that: banding disease was commonest under treatment 8; in all the treatments which included K only 9 out of about 8,000 leaves harvested showed symptoms; in treatments 1 and 2 there were no symptoms; and in treatment 7 only 8 leaves showed symptoms.

2040. SPENSLEY, P. C.  
**Cortisone from Commonwealth sisal?**  
*Chem. and Drugg.*, 1952, 158: 84-6, illus., from abstr. in *DocumBl. trop. Prod. Amst.*, 1952, 7: 568.

It has been discovered that hecogenin, from which it is possible to prepare cortisone, is a component of sisal waste. An account is given of the experimental procedure for preparing hecogenin used in the laboratory of the East Africa Industrial Research Board, Nairobi.

### Hops.

(See also 1839, 2067d, 2379, 2392, 2400.)

2041. MILLER, E. E.  
**The hop production of the Pacific Coast States.**  
 From abstr. in *Proc. Utah Acad. Sci.* 1948/49, 1951, 26: 150-1 [received Jan. 1953].

Reasons are advanced for the shift in hop production from the East and Central U.S.A. to the Pacific Coast States. Average yields per acre in the latter are 800 lb. in Oregon, 1,500 lb. in California and 1,700 lb. in Washington.

2042. BREWIN, J. M.  
**Costs of [hop] production.**  
 [Publ.] *Hops Marketing Board*, 1952, pp. 12-18.\*

The author's purpose is to emphasize the salient features of the costs section of the hops productivity team's report. In hop growing the Americans use about half the labour and materials employed in England but at about twice the cost, so that production costs per

\* Report of meetings convened in October-November 1951 to discuss the report of the Hops Productivity Team.

acre are about equal (1950). In the U.S.A. the layout of gardens (or yards) cuts costs and time, the labour supply situation is such that overhead labour costs are low, and the picking machine is the focal point of all operations. Mechanical picking can cost appreciably less than hand picking in the U.S.A., but because of the relatively higher wage rates it costs 40% more than hand picking in England. Owing to the great differences in garden layout the output of a machine is much greater in the U.S.A. than in England (more than double in an example given), a fact which stresses the effect the growing system can have on picking efficiently by machine at the lowest possible cost.

2043. LIMBERK, J.

Pokusy s roubováním dřevnatých rostlin na rostliny nedřevnaté. I. Roubování chmele na konopí. [Experiments in grafting woody plants on non-woody plants. I. Grafting hops on hemp.] [Russian and French summaries.] *Sborn. čsl. Akad. Zeměd.*, 1951, 24: 11-17, illus. [received Dec. 1952].

Hop seedlings grafted on hemp (*Cannabis sativa*) developed into vigorous plants showing no morphological differences from hops grown on their own roots, and produced cones during the year the grafts were made. The stem lignified normally in the autumn and differentiated dormant buds. A small quantity of seed was obtained by pollinating the flowers of grafted hops with hemp pollen, and the seedlings are being studied.

2044. THOMPSON, F. C., AND BURGESS, A. H.

Influence of mineral nutrition on the resin content of the hop cone. *Nature*, 1952, 170: 890, bibl. 5.

Samples of hop cones taken from a long-term factorial manuring experiment designed to study the effect of different N, P, K and Mg levels on yield did not differ in their resin content. Sand culture experiments also lent support to the earlier findings of Burgess and some Belgian workers—in contrast to German and Czechoslovakian assertions—that mineral nutrition has little influence on resin production in the hop cone. Analytical data on  $\alpha$ -acid,  $\beta$ -fraction and total soft resin content are tabulated.—Wye College.

2045. CAWTHRON INSTITUTE.

Boron deficiency of hops.

*A.R. Cawthron Inst.*, 1951/52, p. 23.

Analysis of hop leaves and cones showed that the average boron contents of 50 samples were 45.8 p.p.m. and 29.6 p.p.m. respectively, the lowest contents of leaves and cones being 20.2 p.p.m. and 22.2 p.p.m. and the highest 70.1 p.p.m. and 30.3 p.p.m. respectively. In the case of B deficiency  $\frac{1}{2}$  oz. borax per hill was found sufficient to effect a cure, while a higher rate or an application of the dressing to a restricted area over the crowns had an adverse effect.

2046. CAWTHRON INSTITUTE.

Distribution of dry matter in hop plants.

*A.R. Cawthron Inst.*, 1951/52, p. 16.

At the time of picking the distribution of the dry matter in hop plants was found to be as follows: Cones 46.6, bines 12.4, leaves on bines 7.5, laterals 18.2, and leaves on laterals 15.3%. Laterals and their leaves showed higher dry matter contents than the main bines and their leaves. The average dry matter contents of cones

and whole plants were 22.4 and 24.5% respectively. On the basis of 1,200 hop plants per acre, the total production of dry matter was 3.9 tons.

2047. HOWARD, G. A.

Evaluation of hops. I. A review.

*J. Inst. Brew.*, 1953, 59: 36-52, bibl. 116.

The main conclusions drawn from this review of current knowledge of scientific hop evaluation are: (1) The preservative and bittering principles in beer which are supplied by the hop are derived from the soft resins. (2) So far as is known, no soft-resin components are present unchanged in the beer, which contains only resin transformation products. (3) These transformation products are derived largely from the  $\alpha$ -soft resins, humulone being a particularly important source. (4) Chemical methods of estimating the potential preservative value of hops are available, but the actual preservative action exerted in the beer, depending as it does on the extent to which the resins have been transformed, cannot be accurately determined by these methods. (5) Microbiological methods and actual trial brewings provide at present the only direct ways of estimating the bacteriostatic action which a hop will exert in a beer, but the accuracy and convenience of most of these methods usually leave much to be desired. [From author's summary.]

2048. HARRIS, G., AND POLLOCK, J. R. A.

Amino acids and peptides of hops and worts.

II. Pipecolic acid, a new amino acid in barley and hops.

*J. Inst. Brew.*, 1953, 59: 28-35, bibl. 14.

A newly recognized amino acid of barley, wort and hops has been identified as 1-(—)-pipecolic acid (piperidine-2-carboxylic acid). It also occurs in *Phaseolus vulgaris* and *Psalliotia campestris*. Since only a few amino acids are known to occur so widely in nature, this distribution (coupled with further observations to be published) suggests that pipecolic acid plays a significant part in the metabolism of plants. [See also *H.A.*, 23: 936.]

*Insecticidal plants.*

2049. TOXOPEUS, H. J.

Studies in the breeding of *Derris elliptica* and *Derris malaccensis*. 1. Variation and the origin of the cultivated material. [Dutch summary 1 p.]

*Euphytica*, 1952, 1: 34-42, bibl. 4, illus.

A survey of the derris population in Indonesia, made as a preliminary to extensive breeding work, showed that many locally cultivated clones exist. Data on the rotenone content of 6 of these clones are tabulated. The wide variation recorded indicated that there are great possibilities of improving production by breeding and selection, especially if the wild population can be used as a source of desirable characters other than high rotenone content, the character on which selection has so far been exclusively based.

2050. BECKLEY, V. A.

Pyrethrum drying.

*Pyreth. Post*, 1952, 3 (1): 9-11, bibl. 1, illus.

Tunnel drying experiments in Kenya established that (1) counter current drying is necessary to obviate over-prolonged drying and (2) the temperature of the hot



air reaching the almost dry flowers should not exceed 140° F. lest there be loss of pyrethrins. Descriptions are given of the Ainabkoi upward natural-draught drier and a much cheaper wooden tunnel-type natural-draught drier.

2051. DELHAYE, R. J.

L'étude de la pourriture des inflorescences de pyrèthre à la station de Mulungu. (Research on pyrethrum bud rot disease at Mulungu station.)

Bull. Inf. I.N.E.A.C., 1952, 1: 305-20, bibl. 5, illus.

After a short note on the disease (*Ramularia bellunensis*) a description is given of experiments conducted at various centres to discover predisposing factors and control measures. It was found that there were 4 main predisposing factors: (1) *climatic*—frequency of mist, perhaps associated with lack of light, constant high humidity with frequent rain, low evaporation, limited variation of temperature with high minima; (2) *soil*—shallow soil, low fertility (the fact that infection occurs after each harvest suggests a temporary nutritional unbalance), absence of rotations; (3) lack of proper *cultural practices*; (4) *plant material*—early clones are more susceptible than late. *Direct control measures* tried were massive and repeated doses of bordeaux mixture, cuproxol, California wash, thiobarine, spersul, zerlate, fermate and phygon. Complete control was not achieved, but substantial improvement was obtained with bordeaux (700 kg./ha.), zerlate, cuproxol and thiobarine. Zerlate was the best and gave a 70% production increase and a 75% decrease in the number of diseased organs, but massive doses were dangerous and in one instance 50 kg./ha. killed the pyrethrum. The fungicides did not cause a reduction in pyrethrin content. *Indirect control measures* are less hazardous and consist mainly of improved cultural practices especially manuring and pruning, control of other pests especially nematodes, and selection and improvement. It was found that drastic cutting back to ground level, especially in February and August (when the yield diminishes), resulted in the production of new shoots almost free from *Ramularia*. It remains to determine whether it is better to burn the cut material or use it as mulch. At present it is used as mulch which is dug in after the first rains.

**Rubber plants.**

(See also 2067f.)

2052. OZEROV, G. V., AND SMOLJSKIĬ, N. V.

Frost resistance of guayule in relation to the age of plants and soil moisture during freezing. [Russian.]

Doklady Akad. Nauk S.S.S.R., 1951, 80: 969-72, bibl. 6 [received Dec. 1952].

In 2 years' trials young guayule seedlings were grown in pots of soil at 70% saturation. The majority were transferred to soil of 30% saturation on 15 October, and later, in January, all plants were submitted to artificial freezing from -12° to -23.5° C. All the seedlings were frost damaged, but, while none of those in the 30% saturated soil were killed outright, some in the soil of 70% saturation were killed. One-year-old plants were more susceptible to frost injury than

2-year-old, as were those carrying inflorescences, i.e. with a lower carbohydrate content. To increase the frost-resistance of guayule in Tadzhikistan, the suggestion is made to arrest growth early in the autumn by withholding moisture from the plants and by planting them more densely than usual.

2053. DYATLOV, I. G.

The mechanization of the sowing of kok-saghyz on mineral soils. [Russian.]

Sel'khoz mashina, March 1952, 13, from abstr. in Agric. hort. Engng Abstr., 1952, 3, No. 1855.

Kok saghyz, a rubber-yielding plant, can be sown only with special drills because of the small size of the seed (about 3 mil. per kg.), some farmers preferring to sow in a wide band, others to place the seed in clusters. The placement of fertilizer is very effective with this crop and the drills shown are of the combined fertilizer placement-seed drill type.

2054. POPOV, A. V.

The stimulation of seed germination in kok-saghyz and tau-saghyz with thiourea. [Russian.]

Doklady Akad. Nauk S.S.S.R., 1952, 84: 619-22, bibl. 9.

Data tabulated show that thiourea has a marked stimulating effect on the germination of kok saghyz seed. It may be used as 0.75-1% at room temperature for 16-18 hours, after which the seed may be sown immediately or be air-dried and kept until required for sowing. Treatment with thiourea is not as effective as stratification but it is much simpler.

2055. LJUKOVA, L. A.

The influence of mineral fertilizers on the composition of latex and quality of rubber in the roots of kok-saghyz. [Russian.]

Doklady Akad. Nauk S.S.S.R., 1952, 85: 917-19, bibl. 12.

From the results of fertilizer experiments with kok saghyz described it is concluded that P and also P+N improve the quality of latex (increase the rubber content of latex and size of globules) and stimulate the development of the latex system. A 45 kg. P<sub>2</sub>O<sub>5</sub> and 33.75 kg. N combination per ha. gave the best quality latex and also the highest yield of roots.

2056. KOLESNIKOV, P. A.

Quinones and the localization of polyphenol-oxidase in kok-saghyz. [Russian.]

Doklady Akad. Nauk S.S.S.R., 1952, 85: 847-50, bibl. 5.

The biological functions of quinones in the metabolism of kok saghyz are discussed.

**Seed oils.**

(See also 2067j, k, o.)

2057. VAN HORN, D. L.

Production and uses of castor beans.

Agric. Engng St. Joseph, Mich., 1952, 33: 711-12.

The main castor bean producing areas of the United States are in Oklahoma and Texas, where the crop is grown under dry-land conditions, and Arizona and

California where irrigated cultivation is practised. Varieties are classified as tall, which are grown under dry-land conditions; intermediate, grown under both dry-land and irrigated conditions; and short or semi-dwarf grown under irrigation. Examples of these types are Conner, Cimarron and Baker 1 respectively. Uses of castor oil are many; the residue known as castor pomace is utilized as an organic fertilizer.

2058. SCHROEDER, E. W., AND REED, I. F.  
**Developing tractor-mounted castor bean harvesters.**  
*Agric. Engng St. Joseph, Mich.*, 1952, 33:  
 775-6, 779, illus.

The limited amount of castor beans grown in the United States used to be harvested with a grain combine, but to make the production of the crop more attractive for commercial growers the need for more efficient harvesters was recognized. The first experimental, single-row, tractor-mounted harvester was built and tested in Oklahoma in 1950, and for the 1951 harvest 60 two-row models were available. On the basis of experience gained and major difficulties encountered with these models, improved types were produced for the 1952 season.

2059. ARMS, M. F., AND HURLBUT, L. W.  
**An experimental harvester for castor seed.**  
*Agric. Engng St. Joseph, Mich.*, 1952, 33:  
 784-6, 790, bibl. 7, illus., being *Pap. J. Ser. Neb. agric. Exp. Stat.* 587.

Trials conducted in Nebraska with an experimental stripper-type harvester indicate that castor seeds can be mechanically harvested from selected varieties with 90 to 97% efficiency. Harvesting efficiency is influenced by weather conditions, time of harvest, type of plants, harvester adjustment and ability of the operator.

2060. SCHOENLEBER, L. G., AND HURST, W. M.  
**Performance of castor bean hulling plants.**  
*Agric. Engng St. Joseph, Mich.*, 1952, 33:  
 708-10, 712, illus.

Hulling-plant equipment consists essentially of 1 or 2 hulling units and blowers, weigh scales with bin-conveying equipment, and electric motor drive. Notes are given on the efficiency of hullers operating in Oklahoma, Texas and California in 1951. Tests showed no significant differences in germination between beans that were not hulled and undamaged hulled beans. Suggestions are made, accompanied by schematical illustrations, to improve the performance of hulling plants.

2061. PORTERFIELD, J. G., AND OPPEL, F. J., JR.  
**An experimental castor bean huller.**  
*Agric. Engng St. Joseph, Mich.*, 1952, 33:  
 713-16, bibl. 5, illus.

An experimental castor bean huller with 18 in. diameter discs rotating in a horizontal plane was built and tested in Oklahoma. The machine was designed so that the spacing between the discs, the type of rubber on the discs, the speed of the discs and other variables could be regulated and controlled. An increase in speed resulted in an increased capacity, but also in increases in unhulled and cracked beans. The optimum spacing for the castor bean variety (US74) used in this test was between 20/64 and 21/64 in. The rubber-faced discs

giving the best performance were the ones which had a difference in hardness between the fixed and rotating discs of 15 durometer points.

2062. ANON.  
**Simmondsia.**  
*Pharm. Weekbl.*, 1952, 87: 502, from abstr.  
 in *DocumBl. trop. Prod. Amst.*, 1952, 7: 603.

A short account of cultural experiments made in the United States on the pignut, *Simmondsia californica*, a drought resistant shrub producing a waxy oil. Notes are given on the properties of the oil.

### *Sundry plants.*

2063. HEINISCH, O.  
 Die vordringlichsten Zuchtziele bei Sanddorn. (The most important aims in breeding sea buckthorn (*Hippophae rhamnoides*).)  
*Züchter*, 1952, 22: 144-7, bibl. 8, illus.

Unless a mechanical method of harvesting is developed the most important breeding aims, apart from selection for high vitamin C content, are easy detachability of the peduncle from the fruiting wood, a long peduncle, a tough and thick skin of the berry and large berry size in order to facilitate picking. Once these objectives and disease and pest resistance have been achieved, the rich fat and protein content of the sea buckthorn berry will also come into the picture.

2064. DARMER, G.  
 Beiträge zur Blütenbiologie des Sanddorns (*Hippophae rhamnoides* L.). (Contributions to the flower biology of sea buckthorn.)  
*Züchter*, 1951, 21: 363-8, bibl. 14, illus.  
 [received 1953].

Since the discovery of the high vitamin C content in the berries of sea buckthorn, the cultivation of the species on marginal or waste land has become an interesting proposition. The author's flower-biological studies, an illustrated account of which is given, suggest the following practical conclusions:—If possible, the female shrubs should be placed in the middle of a planting surrounded by a ring of male shrubs which would guarantee pollination whatever the wind and, moreover, would provide shelter for the fruiting plants. On slopes, the male plants should be planted at the bottom so that the up-draughts may carry the pollen to the female shrubs.—Leipzig Univ.

2065. BLACK, W. A. P., CORNHILL, W. J., AND DEWAR, E. T.  
**The properties of the algal chemicals. I.**  
**The evaluation of the common British brown marine algae as a source of alginate.**  
*J. Sci. Food Agric.*, 1952, 3: 542-50, bibl. 4.

An investigation has been carried out to evaluate the common brown algae indigenous to Great Britain as a source of alginate. In particular, the viscosity of the sodium alginate from each species has been examined, and the effect on the viscosity of drying and bleaching has been studied. In an attempt to show that the alginates from the different species are essentially the same, specific rotations have been determined. [Authors' abstract.]—Inst. of Seaweed Research, Inveresk, Midlothian.



2066. TAUBE, E.

**Carnauba wax—product of a Brazilian palm.**

*Econ. Bot.*, 1952, 6: 379-401, bibl. 36, illus.

The leaves of the carnauba palm, *Copernicia cerifera*, carry the wax as a surface film. The average yield is less than 5 g. per leaf, about 20 leaves being obtained from a tree in 2 cuttings per season. Formerly up to 7 cuttings were made each year, but experience has shown that 2 cuttings, 3 at the most, are less detrimental to the tree. Notes are given on harvesting, collection and uses of the wax.

*Noted.*

2067.

a AKHER, M. A., SMITH, F., AND SPRIESTERSBACH, D.

**The constitution of mesquite gum. Part IV. Determination of the structure of the amide of 6- $\beta$ -(4-Methyl d-Glucopyruronosyl)  $\alpha$ -Methyl-D-galactopyranoside.**

*J. chem. Soc. Lond.*, 1952, pp. 3637-40, bibl. 3.

b ANON.

**Exports of essential oils from the British colonies for the years 1947-50. Domestic exports of essential oils from the dominions for the years 1947-50.**

*Colon. Plant Anim. Prod.*, 1952/53, 3: 28-32. Tabulated data showing countries, type of oil, weights and values for each of 4 years.

c ANON.

**Peppermint and menthol industries of Brazil.**

*Chem. and Drugg.*, 1952, 157: 934-6, illus., from abstr. in *DocumBl. trop. Prod. Amst.*, 1952, 7: 543.

*Mentha arvensis*.

d BLATNÝ, C., OSVALD, V., AND ANTİPOVIČ, D.

**Důležitost popisu vývoje chmelných hlávek pro šlechtitele chmele. (The importance of descriptions of the development of hop cones to the hop breeder.) [Russian and French summaries.]**

*Sborn. čsl. Akad. Zeměd.*, 1951, 24: 101-8 [received Dec. 1952].

e CROSSLEY, A., AND HILDITCH, T. P.

**The component glycerides of stillingia oil.**

*J. Sci. Food Agric.*, 1953, 4: 38-44, bibl. 16.

f FORBES, W. A.

**Rubber in tuin en veld. (Rubber in garden and field.)**

*Rubber*, 1952, 8 (1): 3-4, illus., from abstr. in *DocumBl. trop. Prod. Amst.*, 1952, 7: 317. From *Solidago*, kok saghyz, *Landolphia*, guayule and *Euphorbia resinifera*.

g GEORLETTE, R.

**Les plantes médicinales cultivées en Belgique. (Medicinal plants grown in Belgium.)**

*Ann. Gembl.*, 1952, 58: 195-9, bibl. 49.

An annotated bibliography.

h GLEN, W. L., AND OTHERS.

**Hypotensive alkaloids of *Veratrum album*. Nature**, 1952, 170: 932, bibl. 2.

i GUENTHER, E.

**Recent developments in essential oil production.**

*Soap*, N.Y., March-June 1951, reprinted in *Econ. Bot.*, 1952, 6: 355-78, bibl. 3.

Notes are given on 29 essential oils and their sources of supply.

j GUPTA, S. S., AND MITRA, C. R.

**The component acids and glycerides of refined neem (*Melia indica*) oil.**

*J. Sci. Food Agric.*, 1953, 4: 44-8, bibl. 12.

k HAMMOND, W. E., AND FISCHER, L. K.

**Marketing outlook for some minor oilseed crops in Nebraska.**

*Bull. Neb. agric. Exp. Stat.* 409, 1952, pp. 29, bibl. 12.

Sesame, perilla, rape and mustard.

l KAJI, A., AND OTHERS.

**On the retting of plant fiber materials (barks of mulberry tree) for Japanese paper manufacture. V. Tests for paper making. On the retting of plant fiber materials for Japanese paper manufacture. VI. On the retting of barks of Mitumata tree by acetone butanol fermentation bacteria. VII. On the retting of barks of paper mulberry tree by acetone butanol fermentation bacteria. [All in Japanese with English summaries.]**

*Tech. Bull. Kagawa agric. Coll.*, 1951, 3: 96-100, bibl. 5; 101-5, bibl. 11; 106-10, bibl. 6.

With *Clostridium acetobutyricum*.

m MANIL, P., AND STRASZEWSKA, Z.

**Action de l'hydrazide maléique sur les tumeurs du crown-gall. (The effect of maleic hydrazide on crown-gall.)**

*Bull. Inst. agron. Gembloux*, 1952, 20: 128-31, bibl. 5, illus.

Results on *Datura stramonium* promising.

n MARTIN, W. F., AND OTHERS.

**The isolation of novacine, an alkaloid from *Strychnos nux-vomica*, L. and its identification as N-Methyl-sec-pseudobrucine.**

*J. chem. Soc. Lond.*, 1952, pp. 3603-4, bibl. 2.

o RAO, A. S.

**A gall midge (Itonididae: Diptera) pest of castor in India.**

*Curr. Sci.*, 1952, 21: 347-8, bibl. 2.

*Asphondylia ricini*.

p STRASZEWSKA, Z., AND MANIL, P.

**Action, sur le "crown-gall", du filtrat de culture de *Agrobacterium tumefaciens* et d'une suspension bactérienne pure stérilisée à 48° C. (The effect on crown-gall of culture filtrate and a sterilized culture of *Agrobacterium tumefaciens*.)**

*Bull. Inst. agron. Gembloux*, 1952, 20: 132-6, bibl. 7, illus.

On *Datura stramonium*.

## FLORICULTURE.

*General.*

(See also 1428, 1429, 1430, 1832, 1833, 2133d, f, 2401.)

2068. HANGER, F. E. W.

A note on plastic containers as an aid to seed germination.

*R.H.S. Rhododendron Year Book 1953*, 1952, No. 7, pp. 97-8, bibl. 1, illus.

Experiments have been carried out at Wisley on the use of airtight plastic dishes, such as are used in domestic refrigerators, for seed germination. A wide range of seeds and different media were tested. Small seeds, such as those of primula, rhododendron and begonia, responded excellently, germinating with greater rapidity and certainty and requiring the minimum of attention. The best results were obtained with a medium of pure granulated peat or half vermiculite /half granulated peat. As there is no drainage, and no watering is given until the seedlings are ready for pricking off, it is necessary to use media that will retain large quantities of moisture and are very light. Dishes with a depth of 3-4 in. are most suitable for seed raising; they should be two-thirds filled with compost.

2069. SWEET, D. V.

Use of polyethylene film in the propagation and culture of certain horticultural plants. *Quart. Bull. Mich. agric. Exp. Stat.*, 1952, 35: 265-8, bibl. 1, illus.

Cuttings of chrysanthemum, begonia, fuchsia, carnation, poinsettia, pelargonium and coleus were rooted successfully in damp sphagnum moss wrapped in squares of polyethylene film. No watering was necessary during the rooting period, and disease incidence was remarkably low. Seedlings grew to transplanting size in polyethylene wrappers with the addition of liquid fertilizer. Planting out, in both cases, was simplified by the formation of a compact ball of undisturbed roots. The film was also used successfully to conserve moisture in potted plants.

2070. VINOT, H., AND BOUSCARY, A.

Essai préliminaire sur l'emploi de quelques verres spéciaux en horticulture florale. (A preliminary experiment on the use of some special types of glass in flower production.)

*Rev. hort. Paris*, 1953, 125: 810-13, bibl. 3.

A small-scale experiment was carried out in 1950-51 to compare the effects of ordinary horticultural glass, double horticultural glass, industrial Thermolux 6010 and "Cathedral" glass in frames to cover narcissi and ranunculi. Temperature differences, which varied with duration and intensity of light, are recorded graphically. With narcissi the highest number of flowers was obtained under Thermolux and Cathedral glass, but with ranunculi Thermolux gave the lowest yield. With both crops flowering was earliest under double glass and latest under Thermolux. Thermolux (with narcissi) and double glass (with ranunculi) gave the longest stems. The experiments are being extended.

2071. WASSCHER, J.

De betekenis van de N.A.K.S. voor de cyclamen- en anjerteelt. (The value of the N.A.K.S. [General Netherlands Inspection Service for Ornamental Plants] in the cultivation of cyclamen and carnations.) [English summary  $\frac{1}{2}$  p.]

*Meded. Dir. Tuinb.*, 1952, 15: 577-85, bibl. 11, illus.

The work of the N.A.K.S. with these 2 flower crops is outlined, and it is shown how rigorous inspection of propagation material has resulted in an improvement in the quality of cyclamen seed and in the elimination of the confusion about nomenclature, and, with carnations, in an increase in yields and a substantial reduction in wilt diseases (*Phialophora cinerescens* and *Fusarium oxysporum*). [For paper in English, see *H.A.*, 23: 972.]

2072. FRANKLIN, M. T.

Some plant-parasitic aphelenchs. Disease symptoms and hosts.

*Proc. int. Nemat. Sympos. Training Course, Rothamsted exp. Stat.*, 3-14 Sept., 1951, 1952, pp. 80-4, from abstr. in *Helminth. Abstr.*, 1952, 21: 164 l.

This is a brief comparison of *Aphelenchoides ritzemabosi* with *A. fragariae*. The various symptoms caused by *A. ritzemabosi* in chrysanthemum, black currant and strawberry, usually as an endoparasite in the first and an ectoparasite in the other two hosts, are compared with those caused by the endoparasitic habits of *A. fragariae* in ferns and begonias and its ectoparasitic habits in violets and strawberry. It is pointed out that infestation of common weeds by *A. ritzemabosi* may be a source of danger to susceptible crops.

2073. MASTALERZ, J. W.

Nitrate levels, light intensity, growing temperatures and keeping qualities of flowers held at 31° F.

*Bull. N.Y. St. Flower Grs*, 1952, No. 88, pp. 2-3, illus.

The results are reported of a series of trials. *Soil nitrate*: When carnations, pompon chrysanthemums and snapdragons were grown with 3 levels of soil nitrate (2-14, 5-51, and 20-82 p.p.m.) no differences were found in the keeping quality of flowers held for varying periods at 31° F. and thereafter at room temperatures. *Light intensity*: Maturing pompon chrysanthemum plants were kept in normal light, at half normal light intensity for 14-25 days before cutting, and in darkness for 3 days before cutting. Lowering the light intensity reduced quality, the possible 31° F. holding period and subsequent room temperature life of the flowers. This adverse effect was more pronounced in blooms that were cold stored for a period than in blooms placed immediately in room temperatures. *Growing temperatures*: Carnations grown at 50°-60° F. were moved to 40° and 80° F. one week before cutting. The high pre-cutting temperature resulted in very poor quality and short-lived flowers.



*Annual and herbaceous plants.*

(See also 2133s, u, v, w.)

2074. FULLER, H. J., AND WILSON, S. L.  
Root illumination and flowering.

*Science*, 1952, 116: 688-9, bibl. 3, illus.

The exposure of roots of the short-day plant *Amaranthus caudatus* to photoperiods retarded both the initiation and the growth rates of inflorescences, the effect being more pronounced with a long than with a short exposure to light. There were no apparent differences between treated and control plants in the degree of development of roots and stems, which suggests that the response to light was due to a direct effect on inflorescence initiation and not an indirect effect in retarding plant growth. The growth box designed for the experiment is illustrated.

2075. McLAUGHLIN, H. A. L.

A study of the effects of low temperature upon the blasting of buds in *Antirrhinum majus*. Thesis summarized under the title, Low temperature and "skips" in snapdragons, in *Bull. N.Y. St. Flower Grs*, 1952, No. 85, pp. 2-3, illus.

Under conditions of low light intensity in January snapdragon plants kept continuously at 40° or 50° F. produced few "skips" (flower buds with normal exteriors and disintegrated interiors), but injury occurred when the temperature was lowered from 50° F. to 40° F. or less on 2 or more nights. Similar temperature variations under conditions of stronger light in April did not result in any blasted buds. When plants were shaded in April the spike stems were flattened, hollow and weak.

2076. MOORE, W. C., AND MOORE, F. J.  
Downy mildew of antirrhinum in England and Wales.

*Plant Path.*, 1952, 1: 135-6, bibl. 4.

*Peronospora antirrhini* on antirrhinum has been recorded more than 50 times in 25 counties. Observations have shown that the disease causes more severe damage to plants raised under humid conditions than to those raised under relatively dry conditions, and affects light-coloured varieties more than dark ones. Some conflicting claims on control with both copper and sulphur sprays have been made. There is some circumstantial evidence that *P. antirrhini* is seed-borne, but proof is lacking.

2077. A., F. W.

A virus disease of China aster.

*Gdnrs' Chron.*, 1952, 132: 214, illus.

An extreme distortion of blooms and a certain amount of dwarfing observed on Californian Giant asters were found to be caused by chrysanthemum mosaic virus. Evidence is presented, supported by expert opinion, indicating that the disease was seed-borne. This would appear to be the first recorded case of chrysanthemum mosaic virus in China asters.

2078. HOWARD, L.

Preliminary studies of the rooting response of carnation cuttings as affected by 2,4-dichlorophenoxyacetic acid and other factors. From abstr. in *Proc. Utah Acad. Sci. for 1949/50 and 1950/51*, 1952, 27\* and 28\*: 75.

\* Issued in a single volume with continuous pagination.

In trials with 2,4-D and other growth promoting substances the best rooting response in cuttings of 3 carnation varieties was obtained with "quick dipping" in a mixture of IBA and isopropylamine or triethylamine 2,4-D at 100 p.p.m. and rooting in coarse vermiculite with bottom heat of 65° F. 2,4-D at 1 p.p.m. resulted in excellent production of both wound and morphological roots, whereas in the absence of 2,4-D only basal wound roots were formed. Concentrations of 2,4-D exceeding 100 p.p.m. were unsatisfactory, as were mean room temperatures exceeding 65° F.

2079. SCHWABE, W. W.

Factors controlling flowering in the chrysanthemum. III. Favourable effects of limited periods of long day on inflorescence initiation.

*J. exp. Bot.*, 1952, 3: 430-6, bibl. 3.

Experiments are described which indicate that chrysanthemum cuttings derived from unvernallized long-day stock plants flower sooner and with lower leaf numbers after vernalization than similarly treated cuttings from short-day stock. Long-day treatment of young cuttings also hastens inflorescence initiation provided the period of such treatments is limited and given before or immediately after vernalization. The effect of long days appears to be maximal when vernalization is complete. Long-day treatment cannot take the place of vernalization. [See also *H.A.*, 21: 1883.]—*Imp. Coll. Sci. Tech.*, London.

2080. HOWLES, R.

Chrysanthemum mosaic disease.

*A.R. Cheshunt exp. Res. Stat.* 1951, 1952, pp. 37-40, bibl. 3, illus.

Flower and leaf symptoms of chrysanthemum mosaic are described and illustrated by photographs and susceptible varieties are listed. Virus transmission studies are also reported.

2081. BRIERLEY, P.

Exceptional heat tolerance and some other properties of the chrysanthemum stunt virus.

*Plant Dis. Repr.*, 1952, 36: 243-4, bibl. 2.

The chrysanthemum stunt virus was found to be still virulent after boiling for 10 min., some boiled samples being as infectious as unheated ones. When stunt infected leaves were allowed to dry the virus remained infective for several weeks. The virus retained virulence in some trials after diluting to 1:10,000. As it showed some resistance to alcohol, reliance should be placed on flaming rather than on the alcohol dip for precautionary sterilizing of tools.—*U.S. Bur. Plant Ind.*, Beltsville, Md.

2082. KOFRANEK, A. M.

The effects of artificial light on production of feverfew and marguerite daisy.

*Calif. St. Flor. Ass. Bull.*, 1952, 2 (5): 9, from abstr. in *Bull. N.Y. St. Flower Grs*, 1952, No. 88, p. 4.

Providing one or two foot candles of supplementary light from 10 p.m. to 2 a.m. from 1 February to 5 May increased flower production per plant 20% in feverfew and threefold in marguerite daisies.

2083. DOEPEL, R. F.

**Entylooma leaf spot of English marigold.**

*J. Agric. W. Aust.*, 1952, **1** (n.s.): 501-2, illus.

A leaf spot of calendula, recorded in 1951 from a number of localities in Western Australia, is caused by *Entylooma calendulae*. The affected leaves develop pale yellow spots which increase in size up to  $\frac{1}{4}$  inch in diameter. Such spots later become dark grey. The older leaves are the first to be attacked and during wet weather, which favours the disease, are often completely destroyed. Control measures recommended are rotation, the application of a copper oxychloride spray, and collecting and burning all diseased plants at the end of the season.

2084. TOMLINSON, J. A.

**Brown core root rot of *Primula* caused by *Phytophthora primulae* n. sp.**

*Trans. Brit. mycol. Soc.*, 1952, **35**: 221-35, bibl. 25, illus.

A new disease of polyanthus is shown to be caused by a species of *Phytophthora* hitherto undescribed. The symptoms and records of the disease are described, as are pathogenicity experiments to polyanthus, related species of *Primula* and other hosts. A detailed description is given of the morphological and cultural characters of the *Phytophthora* which is named *P. primulae*. The mode of infection of the parasite, seasonal characters of the disease and control measures are briefly discussed. [Author's abstract.]

2085. STODDARD, E. M.

**Chemotherapeutic control of rhizoctonia on greenhouse stock.**

From abstr. in *Phytopathology*, 1952, **42**: 476.

Root injury by *Rhizoctonia* sp. causes either stunting and death of young stock plants, *Matthiola incana*, or severe wilting of mature plants. This can be controlled by soil application of chemicals, a chemotherapeutic action being indicated, particularly with 8-quinolinol sulphate. One greenhouse trial of this material on a commercial planting of stock was entirely successful. Two other similar trials gave less control but were commercially profitable.

**Bulbs, tubers, etc.**

(See also 1831.)

2086. VEERMAN, J. A.

Het nevelen in de bollen- en in de groenteteelt. (Low volume spraying in bulb-farming and market-gardening.) [English summary  $\frac{1}{4}$  p.]

*Meded. Dir. Tuinb.*, 1952, **15**: 801-4, illus.

The increasing use of high pressure and medium pressure knapsack sprayers on Dutch bulb and potato farms is reviewed, and the possibility of extending their use to other crops and of increasing the speed of work by means of spray booms is discussed.

2087. MORRISON, B. Y.

**Concerning Rex begonias.**

*Nat. hort. Mag.*, 1952, **31**: 237-59, illus.

Brief descriptions are given of some 70 varieties of Rex begonia, 58 of which are represented in clear photographs of individual leaves.

2088. BOUILLENNE, R., AND SIRONVAL, C.

Une nouvelle méthode de culture de *Begonia semperflorens* Link et Otto. (A new method of growing *Begonia semperflorens*.) *Bull. hort. Liège*, 1952, **7**: 349-53, illus.

The new method, which is the result of experiments in the "phytotron" at the Botanical Institute of Liège, not only accelerates the development of the plants so that most of them are saleable by the end of March or the beginning of April, but also assists their branching and establishes a satisfactory equilibrium between growth and flowering. Seedlings (sown at the end of the 3rd week in December) are exposed to intense light from fluorescent lamps for 16 hours a day for 40 days from germination. The artificial light is then replaced by daylight. The experiments are described in detail.

2089. HORTON, F.

**What light intensity for begonias during summer?**

*Bull. N.Y. St. Flower Grs.*, 1952, No. 85, p. 4, illus.

In a trial at Cornell 2 varieties of begonia were placed in June under 0, 1, 2, 4 and 6 thicknesses of cheesecloth. The best results, in terms of absence of leaf burning and compactness of growth, were obtained with 1 thickness of cheesecloth which provided an average of 4,400 ft. candles of light compared with 8,100 ft. candles for unshaded plants.

2090. MAGIE, R. O.

**Soil minor element deficiencies.**

*Gladiol. Mag.*, 1951, **15** (4): 18-21, illus., from abstr. in *Rev. appl. Mycol.*, 1952, **31**: 490.

A disorder affecting gladiolus in Florida about three years ago, characterized by soft spikes, weak, soft stems, and flaccid leaves, was corrected by spraying with a fixed Cu compound and scattering 45 lb. Cu sulphate per acre before planting again. This condition occurs only on new land in plants from corms grown two years in succession on this land. The varieties Valeria and Snow Princess were affected most severely. Soft spikes caused by insufficient K to balance the N supply were prevented by spraying as they developed with 5 lb. K sulphate or carbonate in 100 gal. water. With B deficiency the young leaves were stunted, thickened, and brittle, and the leaf edges sometimes thin, cracked, and colourless. In older plants the cracking occurred near the base of larger leaves. It was corrected by using a fertilizer containing enough B to supply 4 lb. boric oxide or 10 lb. borax per acre, or by spraying every two weeks until flowering with 1 lb. borax in 100 gal. water. The leaves of Fe deficient plants developed entirely yellow for several years in the Sanford district of Florida, chiefly in soils with high Cu residues. In the case of Mn deficiency the leaf veins tend to remain green when the leaf is yellow. When Mn is used in a fertilizer a soluble Fe salt should be added to avoid upsetting the Fe-Mn balance.

2091. MAGIE, R. O.

**Botrytis and curvularia diseases of gladiolus.**

*Bull. N. Amer. Gladiol. Coun.*, 1951, 1951, pp. 1-6, illus., from abstr. in *Rev. appl. Mycol.*, 1952, **31**: 490.

A description is given of the symptoms, factors affecting, and control of *B. gladiolorum*, which is one of the



most important diseases on gladiolus in the United States. Young plants and flowers of most varieties are very susceptible to *Curvularia lunata*, particularly those grown from seeds and cormels, which are often attacked at or below soil level. Affected corms develop firm, sunken, black lesions and corking-out often occurs. Corm rot, however, is troublesome in only a few varieties. Infected plants or moist, infected soil provide a source of infection for the next crop which is reduced by digging in dry weather and curing with heat and fans immediately after harvest. The fungus survives for two years in sandy soil and may live for several years in competition with other soil fungi and bacteria. The flowers of all varieties tested were more or less susceptible when inoculated. Very few varieties were susceptible when grown from larger corms. Both diseases have been controlled satisfactorily in Florida for the past three years by zineb sprays (2 lb. in 100 gal. water) applied twice a week, or more often when necessary.

2092. SCURTI, J.

L'ossichinolina nella lotta contro la malattia del giallume dei gladioli. (Control of gladiolus yellows with oxyquinolin.) [English summary 7 lines.]

*Ann. Sper. agrar.*, 1952, 6: 1715-20, bibl. 15.

In an *in vitro* experiment with oxyquinolin sulphate at concentrations ranging from 1: 5,000 to 1: 1,000,000, the compound inhibited development of the mycelium of *Fusarium orthoceras* var. *gladioli* when used at 1: 25,000 and higher concentrations. In a field experiment three plots each of 100 corms were treated with nil, 1: 1,000 and 1: 4,000 aqueous solutions respectively of the compound. The treatments were applied twice weekly for the first month, and weekly for the second month until shortly before flowering, 5 l. being used each time. In the first plot 25 plants appeared but only 15 developed and of these only 8 flowered moderately. In the second 30 developed, of which 24 flowered normally, and in the third 30 developed and 26 flowered normally.

2093. PALM, E. T.

Effects of certain mercurial fungicides on gladiolus plants.

From abstr. in *Phytopathology*, 1952, 42: 518.

Phytocidal effects of pre-planting corm treatments with several mercurial fungicides on Picardy gladiolus plants were determined in both field and greenhouse plots. Higher concentrations of all fungicides tested delayed emergence and flowering, resulting in the production of fewer flowers and smaller corms.

2094. HARRISON, I. R.

*Pediculopsis* sp.—a mite found on acid-anthera and gladiolus corms.

*Plant Path.*, 1952, 1: 119-20, bibl. 1, illus.

The occurrence of a large number of mites, *Pediculopsis* sp., on a consignment of corms imported from Holland in 1952 is reported. Experiments conducted at the Plant Pathology Laboratory, Harpenden, indicated that the mite is unable to establish itself in large actively-reproducing colonies unless botrytis is present, although they do distribute botrytis spores. No evidence was forthcoming, however, that the mite is capable of spreading botrytis infection.

2095. DUSTAN, A. G.

Standard control recommendations for the gladiolus thrips.

*Proc. Publ. Ser. Ent. Canada Dep. Agric.* 69, 1952, pp. 5, illus.

Lysol at 4 teaspoonfuls per gal. water is replacing corrosive sublimate. The corms should be soaked in the solution for 6 hours.

2096. CORTVRIENDT, S. F., AND DE GROOTE, R.

Essais de fumure sur gloxinia et bégonia. (Manurial trials with gloxinia and begonia.)

[English summary 5 lines.]

*Rev. Agric. Brux.*, 1952, 5: 1311-18, illus.

*Gloxinia hybrida* var. Hollywood: Unbalanced and high dosages of artificial fertilizers checked development, but suitable applications considerably increased average tuber weight and percentage of large-sized tubers. Of the various quantities and combinations tested in these preliminary trials the following dosage proved to be the most beneficial: 10 g.  $\text{KNO}_3$ , 30 g.  $\text{KH}_2\text{PO}_4$  and 10 g.  $(\text{NH}_4)_2\text{SO}_4$  per  $\text{m}^2$ . *Begonia tuberosa*: The results obtained support the recommendation of a 12-20-26 fertilizer applied at the rate of 8-10 kg. per 100  $\text{m}^2$ . The manurial experiments with both plants are being followed up with an investigation on tuber storage.

2097. ROYAL HORTICULTURAL SOCIETY.

*The lily year book*, 1953, No. 16.

R.H.S., London, 1952, 9×6 in., pp. 167, illus., 15s.

Of the several papers in this number on lily species and hybrids, the following perhaps deserve special mention: "Lilies introduced since 1900" by H. F. Comber, describing some of the most outstanding species; "List of names of hybrid lilies" by L. Roper, with notes on their origin; and "Lilies at the Oregon Bulb Farm, U.S.A." by Jan de Graaf, describing his work on raising hybrids that can be grown in many regions of the United States. Some other aspects of American work, including propagation, breeding and forcing, are described in "The lily research programme at the Beltsville Station" by S. L. Emsweller. From New Zealand comes an account of a successful amateur method of growing and hybridizing *L. auratum* with no glass and little labour, and more encouragement for the enterprising amateur will be found in the articles "Lilies in a London garden" and "Lilies in a suburban garden". Growers will glean many practical hints from the discussions of the Lily Group meetings reported here. [See also next abstract.]

2098. MILES, P.

An investigation into the effects of mineral deficiencies on the Easter lily.

*R.H.S. Lily Year Book*, 1953, 1952, No. 16, pp. 79-83, bibl. 5.

A sand culture experiment was carried out at Long Ashton Research Station to determine the effects on the Easter lily (*Lilium longiflorum*) of deficiencies of N, P, K, Ca and Mg. Marked foliage symptoms developed during the first year on plants deficient in N and Mg, and all treatments affected time of flowering slightly and maturation of the foliage considerably. The bulbs were left in pots for a second year. The results obtained during this period were on the whole similar to those obtained during the first year, except in the case of the

calcium deficient plants. After fairly normal growth in the first season these subsequently made almost no growth and total breakdown of the bulbs occurred. Little secondary growth at the end of the season was made by the N and P deficient bulbs and none by the Ca deficient bulbs.

2099. ROYAL HORTICULTURAL SOCIETY.

*The daffodil and tulip year book, 1953, No. 18.*

R.H.S., London, 1952, 9×6 in., pp. 192, illus., 15s.

This 1953 number of the *Daffodil and Tulip Year Book* is devoted almost entirely to daffodils, tulips making an appearance in only one article, "Tulips for bedding" by W. Austin. It is interesting to speculate whether this emphasis is a reflection of the modern aesthetic taste for the subtle and informal, or whether it is connected with the historical development of the two flowers. Austin mentions that "the passion for the tulip spread very rapidly in the early seventeenth century", whereas C. F. Coleman, in a delightful article on wild daffodils, points out that "barely 70 years ago the only daffodils in cultivation were some of these wild species with a very few hybrids between them that were mainly chance seedlings". That the daffodil is still in a stage of active development is apparent from the vast amount of information in this volume on new forms and varieties (including, incidentally, a note on a double *bulbocodium*) and on the various shows and trials which make it possible for the public to keep abreast of the new developments. The account of the aims and achievements of the daffodil trials at Wisley, in which varieties are judged solely on their value as decorative plants for the garden, shows how rigorous the selection has to be. [See also next abstract.]

2100. BEAUMONT, A.

**Observations on the incidence of narcissus stripe in south-west England.**

*R.H.S. Daffodil and Tulip Year Book, 1953, 1952, No. 18, pp. 90-100, bibl. 13.*

Observations on the incidence of the narcissus stripe virus disease in the field are summarized in relation to the practical problem of its control. Lists are given of susceptible and resistant varieties. No stripe symptoms have been recognized in the Poetaz group and infection is rare in the Polyanthus and Poeticus groups. There is considerable seasonal variation in symptom expression. There is no evidence that the amount of stripe is increased by bulb splitting, hot water treatment, cold storage of bulbs, leaf contact or seed transmission. Evidence for transmission by insects or by root contact is uncertain. Rogueing is considered commercially worth while for reducing the amount of stripe to reasonable proportions.

2101. STANILAND, L. N.

***Ditylenchus dipsaci*: methods of control.**

*Proc. int. Nemat. Sympos. Training Course, Rothamsted exp. Stat., 1951, 1952, pp. 69-74, from abstr. in Helminth. Abstr., 1952, 21, No. 164 j.*

The author points out the importance of good husbandry and crop rotation and then deals in detail with experimental work on the hot-water treatment of bulbs. He deals also with the thermal death curves of some eelworms, including *Ditylenchus dipsaci*, and shows how

this is applied to hot-water treatment of strawberry and other plants. Another section deals with the treatment of seed with iodine and chlorophenol, and with the fumigation of bulbs and plants with methyl bromide.

2102. ROBSON, J. W.

**Protection against bulb flies.**

*Search, 1952, No. 4, pp. 47-52, illus.*

Two years' trial with BHC and DDT against the bulb flies *Merodon equestris* and *Eumerus* spp. showed that BHC is the better material. Dusts are normally more effective than sprays but sprays may be more suitable in dense weedy cover. Dust must be applied from an overhead position into the neck of the bulb, and hedges, dykes, etc., round the field should be treated at each application. The schedule for the special formulation Gammalin 2 against the large bulb fly *Merodon* in Cornwall is: 2nd/3rd week April (prior to first attack) 1½ cwt. per acre, 2nd week May ¾ cwt., 3rd/4th week May ¾ cwt., 1st/2nd week June ¾ cwt. If the small bulb fly is also present a further application of ¾ cwt. should be made in the 4th week of June or 1st week of July.

2103. GOULD, C. J., AND MCLEAN, D. M.

**Black rot of iris, tulip and hyacinth bulbs.**

*From abstr. in Phytopathology, 1952, 42: 514.*

An unusual rot of certain ornamental bulbs has been observed in western Washington for some years. It appears in bulbous irises early in the spring as a yellowing and wilting of one or more plants. The rot starts on the underground shoot near the top of the bulb. The fungus penetrates to the centre of the bulb, which becomes soft and, finally, nothing remains except decayed bulb fragments and black sclerotia. The rot occurs also on hyacinths and tulips. Croft lilies were not affected in greenhouse tests. The fungus has not yet been identified.

**Lawns.**

(See also 2133a, h.)

2104. MEINERS, J. P.

**Etiology and control of snowmold of turf in eastern Washington.**

*From abstr. in Phytopathology, 1952, 42: 516.*

Snowmould of turf in eastern Washington appears to be caused by a combination of 2 organisms, *Fusarium nivale* and *Typhula itoana*, with the former usually dominant. Fifteen fungicides were applied in December to replicated plots in Pullman and Spokane. In the former, where the disease amounted to 95.6% in untreated plots, only PMAS, Puraturf and Calochlor gave practical control. In Spokane where infection in untreated plots was only 18.1% the same 3 fungicides and also Tersan and Chloranil were effective. Method of application (viz. wet or dry) generally had no effect on the degree of control.

**Orchids.**

(See also 2133t, z.)

2105. HOEREE, J.

**Het kunstmatig verwekken van mutaties bij orchideeën. (The artificial production of mutations in orchids.)**

*Cult. Hand., 1952, 18: 639-41, illus.*



A laboratory method for treating orchid seed with colchicine and growth substances, that has been devised at the State Agricultural High School, Ghent, is described, and some results that were obtained with *Cymbidium*s, a *Miltonia* hybrid and a *Cattleya* hybrid are reported.

2106. MURAKISHI, H.

A new fungus disease of orchid seedlings in Hawaii.

From abstr. in *Phytopathology*, 1952, 42: 517.

Root rot and wilt of *Cattleya*, *Dendrobium*, *Phalaenopsis* and *Vanda* seedlings occur frequently during rainy periods. Isolations made from water-soaked and blackened lesions on roots and crowns of affected seedlings and older plants consistently yielded a *Fusarium*. When rooted *Vanilla* cuttings were inoculated with 4 orchid *Fusarium* isolates, no root rot or wilt resulted, although the plants were maintained in infested medium for over 6 months. Satisfactory control of the disease on *Vanda* seedlings was obtained by soaking the plants and pot in 1-2,000 Arasan or Tersan suspension.

2107. ALVAREZ GARCÍA, L. A.

A new disease of orchids in Puerto Rico: pythium black rot.

*J. Agric. Univ. Puerto Rico*, 1951, 35: 126-35, bibl. 4, illus. [received 1953].

The disease—a strain of *Pythium ultimum* which attacks *Laelio-cattleya* and *Cattleya* spp.—and control measures are described.

### Succulents.

2108. SCHWANITZ, F.

Untersuchungen an polyploiden Pflanzen. XIII. Zellgröße und Blütenfüllung. Untersuchungen an polyploiden Formen von *Bryophyllum daigremontianum* Hamet et Perrier sowie an gefüllten und ungefüllten Formen verschiedener Gartenpflanzen. (A study of polyploid plants. XIII. Cell size and double flowers. A study of polyploid forms of *Bryophyllum daigremontianum* and of various garden plants with double and single flowers.)

*Züchter*, 1952, 22: 244-54, bibl. 7, illus.

- (1) An examination of the flowers of 2n, 4n and 8n plants of *Kalanchoe daigremontiana* showed that each chromosome doubling delayed flowering by a fortnight, reduced the number of flowers formed per plant and increased the percentage of flower primordia shed.
- (2) The diameter of flowers and the width of individual floral organs increased with chromosome numbers.
- (3) The number of sepals increased from 2n to 4n flowers but not any further, whereas the number of petals kept increasing from 2n to 8n flowers. In tetraploids the number of stamens and carpels was higher than in diploids, but the organs of octoploid flowers, especially in the androecium, showed reductions. The tendency to an increased number of petals in polyploid plants was also observed in *Kalanchoe blossfeldiana*, *Salvia splendens*, *Malva silvestris* and *Linum usitatissimum*. The same is reported of Lorraine begonias.
- (4) In varieties of 20 ornamental species double flowers

had, without exception, larger cells than single flowers with the same number of chromosomes. This observation lends further support to the author's theory that cultivated plants are gigas forms of wild plants [*H.A.*, 21: 2070].—Inst. f. Blattfaserforschung, Niedermarsberg, Westfalen.

### Roses.

(See also 2133x.)

2109. STATENS FORSGSVIRKSOMHED I PLANTEKULTUR.

Forsøg med forskellige grundstammer til sorter af roser. Foreløbig meddelelse. (Trials with several rose rootstocks. Preliminary communication.)

*Tidsskr. Planteavl*, 1952, 56: 165-8, being *Medd. Statens Forsøgsvirks. Planteavl*. 480.

The following rootstocks were tested at Virum in combination with 5 rose varieties, namely *Rosa canina*, *R. canina* Kokulinski, *R. multiflora*, *R. rugosa* and *R. eglanteria* (*rubiginosa*). Preliminary data on rootstock effect upon flowering and on the number of cut shoots and suckers are tabulated. It is too early to make recommendations, but it appears that *R. rugosa* and *R. eglanteria* are less suitable than the others. Flower colour was not affected. The experiment is being continued.

2110. DROUINEAU, G.

Culture sans sol. (Soilless culture [of roses].) *Ann. agron. Sér. A*, 1951, 32: 565-6, illus. [received 1953].

In two years' trials at Antibes the soilless culture of roses proved very successful. A comparison of production costs with that of traditional, commercial plantings in the neighbourhood is planned for the coming year.

2111. MASSEY, D. M., AND OWEN, O.

Lime-induced manganese deficiency in glass-house roses.

*A.R. Cheshunt exp. Res. Stat.* 1951, 1952, pp. 81-3.

Extended experiments confirmed that an application of 4 oz. sulphur per sq. yard will correct chlorosis of roses due to lime-induced manganese deficiency.

2112. MASTALERZ, J. W.

Blueing of Better Times roses.

*Bull. N.Y. St. Flower Grs*, 1952, No. 87, pp. 2-3.

Better Times rose flowers hardened in water for 3 to 24 hrs before packing developed a blue discoloration after 12 to 15 days storage at 31° F., whereas flowers packed and stored direct from the plants retained their red colour. Blueing was accompanied by reduced respiration. It is recommended that hardening in water should be avoided or, if unavoidable, should not exceed 1 hr. If hardening exceeds 2 hrs the flowers should not be held for more than 7 days at 31° F. or for shorter periods at higher temperatures.—Cornell Univ.

2113. KELLER, J. R.

Botrytis damage to rose flowers.

*Bull. N.Y. St. Flower Grs*, 1952, No. 87, p. 4, illus.

Botrytis injury, which resembles bruising, and the

factors promoting it are described. The best preventive measure is to keep the flower heads dry. A promising new treatment [not described] is under study at Cornell University.

*Other trees and shrubs.*

(See also 2133a, b, i, j, l, m, o, q, r, y.)

2114. WILSON, A. E.

**Tree planting in streets.**

*Agric. Gaz. N.S.W.*, 1952, 63: 457-60, 521-2, illus.

An account is given of the most suitable species and methods of planting ornamental trees in the streets of New South Wales, with information on preparation for planting, shaping, pruning and lopping, and maintenance.

2115. NEWTON, W.

**Effects of the application of fungicides to wounded plant tissues.**

*Sci. Agric.*, 1952, 32: 659-62, bibl. 4.

The application of Arasan and Spergon dusts to wounded plant tissues, potato sets, and cuttings of cypress, tamarisk, sequoia, and holly usually exerted favourable effects as measured by the number of cuttings that rooted and survived. A Fermate dust treatment improved the rooting of tamarisk and sequoia cuttings, but not those of cypress. On the other hand, Ceresan and Semesan dust treatments reduced the number of cypress cuttings that survived. Arasan, Spergon, and Fermate do not appear to interfere with the natural healing of wounded tissue to the same extent as fungicides that contain copper and mercury, as measured by the loss of water from potato tissue cylinders. The inclusion of naphthalene acetic acid with Arasan, Spergon, and Fermate in treatments of cypress, tamarisk, and sequoia cuttings had no beneficial effect on rooting or survival, but had a favourable effect upon holly cuttings.—Lab. of Plant Pathology, Saanichton, B.C.

2116. GILGUT, C. J.

**Flower growers! Protect azaleas in the fall.**

*Res. in Rev.*, 1952, 1 (2): 12-13, illus.

Experiments at Massachusetts University indicated that frost injury in azaleas and rhododendrons can be reduced or prevented by withholding water in October and root-pruning in rainy seasons at least 2 weeks before expected frosts.

2117. WALKER, J.

**Propagation of caragana.**

*Rep. Proc. 8th annu. Mtg west. Canad. Soc. Hort.*, 1952, pp. 87-91, bibl. 9.

A review of caragana propagation by seed and by cuttings. For the most part, discussion and data given pertain to the Siberian pea-shrub, *Caragana arborescens*.

2118. RHODAS, A. S.

**The destructiveness of clitocybe root rot to plantings of casuarinas in Florida.**

*Lloydia*, 1952, 15: 161-84, bibl. 6.

The uses and economic importance of the casuarinas or so-called Australian pines for ornamental, roadside and windbreak plantings in Florida are discussed. They are found to be extremely susceptible to mush-

room root rot caused by *Clitocybe tabescens*. The soil conditions conducive to the presence of this rot are discussed.

2119. ESSON, J. G.

**The sourwood—a neglected tree.**

*J. N.Y. bot. Gdn.*, 1950, 51: 12-15, illus.

[received Dec. 1952].

Old references to the sourwood or sorrel tree, *Dirca palustris*, in the botanical literature are cited and a plea is made for its wider use in gardens to-day. Hints on propagation and an illustrated description are also given.

2120. LI, H. L.

**The genus *Elaeagnus* in Formosa.**

*Lloydia*, 1952, 15: 156-60.

A key to the species is followed by descriptions, sometimes with the addition of botanical details in Latin, of 8 *Elaeagnus* spp. found in Formosa and the adjacent islands.

2121. SCHENK, P. J.

**Uitwassen aan de wortels van *Elaeagnus*.**

**(Excrecences on the roots of *Elaeagnus*.)**

*Cult. Hand.*, 1952, 18: 650-1, illus.

It is considered that the excrecences sometimes found on the roots of *Elaeagnus* and *Ahnus*, which were previously attributed to *Plasmodiophora* infection, are probably root nodules formed by symbiotic microorganisms. Little evidence is given.

2122. DRIVER, C. H.

***Physalospora ilicis* on rotundifolia holly in Georgia.**

*Plant Dis. Repr.*, 1952, 36: 355, bibl. 1, illus.

Bushes of the rotundifolia holly (*Ilex crenata* var. *rotundifolia*) with leaves infected with *Phyllosticta ilicicola* (*Physalospora ilicis*) were seen in September, 1951. Symptoms are described. In the area in which the collection was made 17 out of 20 plants died within 30 days of the disease being first observed. The plants were 3 years old and had been purchased from a local nursery. The fungus is briefly described.—La St. Univ.

2123. BRIERLEY, P., AND SMITH, F. F.

**A ringspot virus from hydrangea infectious to herbaceous plants.**

*Plant Dis. Repr.*, 1952, 36: 382-3.

A North Carolina florist brought to the attention of the authors a disease of Strafford hydrangeas that rendered them unsaleable. The flowers were small and poorly developed, and the leaves were stiff, rugose, and mottled light and dark green. From such plants a ringspot virus was isolated in tobacco, and transmitted from tobacco to cucumber, zinnia, China aster and snapdragon. Attempts to transmit the virus from hydrangea to hydrangea, by means of common greenhouse pests of hydrangea as possible vectors, failed.—U.S. Dep. Agric., Beltsville, Md.

2124. KNOWLES, R. H.

**Vegetative propagation of *Juniperus* species and varieties.**

*Rep. Proc. 8th annu. Mtg west. Canad. Soc. Hort.*, 1952, pp. 93-7, bibl. 9.

In reviewing the literature the author states that indolebutyric acid appears to have almost universal acceptance as a growth substance for rooting *Juniper* spp.



and varieties. Sand is generally recommended as rooting medium, but for spring and summer cuttings the inclusion of such water-retentive material as peat is thought advisable.

2125. BEALE, J. H., AND BEALE, H. P.

Transmission of a ringspot-virus disease of *Syringa vulgaris* by grafting.

Contr. Boyce Thompson Inst., 1952, 17: 1-6, bibl. 5, illus.

The symptoms of a ringspot disease of common lilac are described and illustrated. The disease was observed by the authors on three unidentified varieties in the U.S.A., England and Norway and on several named varieties in the U.S.A. It was experimentally transmitted to other varieties by grafting and budding. It is concluded that the causal agent is a virus, and that the disease was probably introduced to the U.S.A. from Europe and distributed by means of infected stock.

2126. MINDEY, G.

A method of propagating magnolias.

J. roy. hort. Soc., 1952, 77: 449-50.

Budding was used as a means of producing shoots of the desired variety followed by deep potting or planting to encourage scion rooting. For precocious flowering Chinese and Himalayan species the best stocks tried were *M. kobus* and *M. salicifolia*. One-year-old seedlings of these species, potted in 4½-in. pots, reach ½-¾ in. diam., the ideal stage for budding, by mid-summer. 90% success should be obtained.

2127. BOND, G.

Some features of root growth in nodulated plants of *Myrica gale* L.

Ann. Bot. Lond., 1952, 16: 467-75, bibl. 5, illus.

The roots which are produced in large numbers from the root nodule clusters in *Myrica gale* have been observed by the author to be characterized by vertically upward growth under a wide range of cultural conditions, evidence having been obtained that the same is true in the field. Experimental investigation indicates that the orientation is the result of negative geotropism. Structural and experimental evidence permits the view that these upward-growing roots facilitate the ventilation of the nodule tissues. This is likely to be of special significance under the bog conditions in which the species commonly grows. [Author's abstract.]

2128. HEWLETT, M. A.

Two leaf spots of myrtle new to Great Britain, caused by the fungi *Pestalotia decolorata* and *Cercospora myrti*.

J. roy. hort. Soc., 1952, 77: 413-18, bibl. 7, illus.

*Pestalotia decolorata*: Symptoms, which appear to occur chiefly in winter, are severe leaf spotting (cream or light brown centres with dark red margins) followed by serious and sometimes almost complete defoliation which leads to some die-back and general retardation of growth. The morphology and biology of the fungus are briefly described. Infection was readily obtained in autumn and early winter by placing spores on healthy wounded or unwounded leaves but was not obtained in this manner in spring and summer. Suggested control

measures are the sweeping up and burning of fallen leaves followed by spraying the plants with a colloidal Cu spray, and a further spraying in spring. *Cercospora myrti*: The symptoms were leaf spots or blotches (dark reddish-purple centres with light coloured margins). Severely affected leaves may fall. The morphology and biology of the fungus are briefly described. Artificial infection of healthy plants was readily obtained. Control measures are the collection and burning of fallen leaves followed by the spraying of the plants with colloidal Cu or bordeaux mixture. Several sprays at fortnightly intervals may be necessary and in severe cases cutting back may be worth while.

2129. ROYAL HORTICULTURAL SOCIETY.

The rhododendron year book, 1953, No. 7.

R.H.S., London, 1952, 9×6 in., pp. 148, illus., 15s.

Articles of general interest in this number include extracts from "Some notes on rhododendrons" by the late Lionel de Rothschild, "Rhododendrons in the Royal Botanic Garden, Edinburgh" by J. MacQueen Cowan, and "Rhododendrons at Muncaster Castle" by P. M. Syngé. There are also notes on two new species from Nepal, early flowering, hardy varieties, drought resisting varieties, and the hardness of varieties on the east coast of Scotland. From America comes a stimulating account of the creation of the trial garden of the American Rhododendron Society, a description of the Tacoma Rhododendron Show and a report of trials in New Jersey on propagation by cuttings. [This last paper, and others on propagation experiments, have been abstracted separately.]

2130. ROPER, L.

Rhododendron seedlings.

R.H.S. Rhododendron Year Book 1953, 1952, No. 7, pp. 98-9.

A note is given on an unusual method of treating rhododendron and azalea seedlings, which is practised successfully in a high rainfall area in Donegal. Ground is cleared in a woodland under light shade and covered with "castles" of compost turned out from 6 in. pots. The compost consists of natural forest soil and sand in a 2:1 ratio. A seedling is planted on each pile of compost. In this way it is possible to move the young plants at any season with no disturbance to the roots.

2131. WELLS, J. S.

The propagation of rhododendrons from stem cuttings.

R.H.S. Rhododendron Year Book 1953, 1952, No. 7, pp. 74-82, illus.

The usual method of propagating rhododendrons by grafting on *R. ponticum* rootstock has two serious disadvantages in the eastern United States: *R. ponticum* is highly susceptible to *Phytophthora cinnamomi* attack, and the stocks require 4 years in the nursery before they are ready for sale. Varieties propagated on their own roots are resistant to the disease and require only 1-2 years in the nursery. The hardy varieties suitable for New Jersey conditions, however, are very difficult to propagate from cuttings. From experiments which were started in 1947, techniques are being developed which should make it possible within the next 2 years to produce all varieties economically from stem cuttings.

The most suitable treatments vary with each variety and the factors affecting success are discussed here. Timing is one of the most important factors, and the best season for taking cuttings usually falls between early August and the end of September. Thin cuttings from side growths are most suitable. Short cuttings, 3-4 in. long, root most readily. Wounding is very important and is best done by removing a thin slice, about 1½ in. long, from the base of the cutting. Easily rooting varieties responded well to growth substance treatment with 0.008% indolebutyric acid dust, but for the more difficult varieties the most active compounds available were required. Dr. Dresselhuys, for instance, responded excellently to a 1% dust of 2,4-dichlorophenoxy alpha propionic acid or 2,4,5-trichlorophenoxy alpha propionic acid. Rooting was greatly increased when the houses were kept under a constant mist during the day. Other factors dealt with are medium, bottom heat, air temperature, light, potting and subsequent treatment.

2132. YEATES, J. S.

**Tip grafting of rhododendrons, azaleas and other plants.**

*R.H.S. Rhododendron Year Book 1953*, 1952, No. 7, pp. 83-8, bibl. 2, illus.

Experiments were carried out at the Massey Agricultural College, New Zealand, to determine whether tip grafting onto the current season's wood of the stock could be used as a regular method of propagating rhododendrons. A successful technique was developed in which the stock is used at a stage of active growth, not more than half-ripe, and the scion at a stage when the new leaves are fully firm. The tip of the stock is removed leaving a stem of 6-9 in., which is slit down the middle to a depth of 1½ in. The wedge-shaped scion with 3-4 leaves is inserted in the usual manner, and the grafted plants are kept in a closed propagating case for 6-8 weeks. Compared with the traditional method of veneer grafting, a higher percentage take was obtained with difficult varieties, the ease and speed of working was greater, and the subsequent growth of plants was very good. The higher union was not a real disadvantage. The method was also used satisfactorily with azaleas at any time between the soft, brittle stage to the half-ripe stage of stock and scion. As it does not allow a stooling habit of growth, however, it is mainly suitable for propagating new varieties. Half-ripe shoots of *Camellia reticulata*, a difficult plant to propagate, were also readily tip grafted onto half-ripe stocks of *C. japonica*.

*Noted.*

2133.

a AMSLER, A. M.  
**Daphnes.**

*J. roy. hort. Soc.*, 1953, 78: 5-18.

Propagation, cultivation and various species.

b BANNAN, M. W.

**Further observations on the reduction of fusiform cambial cells in *Thuja occidentalis* L.**  
*Canad. J. Bot.*, 1953, 31: 63-74, bibl. 6, illus.

c BERNARD, J.

**Note sur deux *Cacoecia* (Lépidoptère, Tortricidae) occasionnellement nuisibles aux cultures florales. (Notes on two *Cacoecia* spp. which are occasionally injurious to flower crops.)**

*Bull. Inst. agron. Gembloux*, 1952, 20: 148-9, bibl. 9, illus.

*Cacoecia costana* and *C. semialbana*.

d CHAPELLE, C.

**Successions florales dans les domaines publics et privés. (Succession of flower crops.)**  
*Bull. hort., Liège*, 1953, 8: 20-4.

In cool and warm greenhouses.

e COOPER, A. E.

**Establishing the new lawn.**

*Circ. Pa agric. Ext. Serv.* 407, 1952, pp. 9, illus.

f GEORLETTE, R.

**Les chasseurs de plantes. II. À la recherche des cactées. (Plant collectors. II. The search for cacti.)**

*Ann. Gembl.*, 1952, 58: 175-85, bibl. 62.

g GOODEY, J. B.

***Rotylenchus coheni* n.sp. (Nematoda: Tylenchida) parasitic on the roots of *Hippastrum* sp.**

*J. Helminth.*, 1952, 26 (2/3): 91-6, from abstr. in *Helminth. Abstr.*, 1952, 21, No. 97e.

h GRAU, F. V.

**Meyer (Z-52) zoysia.**

*Gdn J. N.Y. bot. Gdn*, 1952, 2: 4-5.

See *H.A.*, 22: 2888.

i HARKNESS, B.

**Hardiness records of woody plants at Rochester, New York.**

*J. N.Y. bot. Gdn*, 1950, 51: 210-14, 219, illus. [received Dec. 1952].

j HASEGAWA, M., AND SHIRATO, T.

**Flavonoids of various *Prunus* species. I. The flavonoids in the wood of *Prunus yedoensis*.**

*J. Amer. chem. Soc.*, 1952, 74: 6114-15, bibl. 11.

*P. yedoensis* is the most commonly cultivated flowering cherry species in Japan.

k HICKMAN, D., AND CULBERT, J. R.

**African violets (*Saintpaulia ionantha*) in the home.**

*Circ. Ill. Coll. Agric.* 695, 1952, pp. 24.

Culture, propagation, diseases, pests and varieties.

l KROMDIJK, G.

**Het vervroegen van hortensia's. (Forcing hydrangeas.)**

*Cult. Hand.*, 1952, 18: 644-6.

Soils, temperatures, watering, manuring and diseases.



- m MCKAY, J. A.  
**Propagation of lilacs.**  
*Rep. Proc. 8th annu. Mtg west. Canad. Soc. Hort.*, 1952, pp. 98-101, bibl. 3.  
Including air-layering.
- n MESSING, J. H. L., AND OWEN, O.  
**The effects of some acute mineral deficiencies on perpetual-flowering carnations.**  
*A.R. Cheshunt exp. Res. Stat.* 1951, 1952, pp. 78-81.  
Symptoms of N, P, K, Ca, Mg, S and B deficiencies.
- o MORAN, P. J.  
**Literature review of propagation of spirea.**  
*Rep. Proc. 8th annu. Mtg west. Canad. Soc. Hort.*, 1952, pp. 91-2, bibl. 6.
- p PETRI, P. S.  
Un caso di fioritura invernale del "*Chaenomeles japonica*" Pers a Bologna. (A case of winter flowering in *Chaenomeles japonica* at Bologna.) [English summary 9 lines.]  
*Riv. Fruttic.*, 1953, 15: 26-30, bibl. 10, illus.
- q POZDNIJAKOV, L. K.  
**An intergeneric hybrid from the Rosaceae.** [Russian.]  
*Doklady Akad. Nauk S.S.S.R.*, 1952, 85: 1161-4, illus.  
*Cotoneaster melanocarpa* × *Sorbus sibirica*.
- r RUYS, J. D.  
Veredelingswerk bij vaste planten. (Breeding work with hardy perennial ornamentals.)  
*Not. Studiekring voor PIVered.*, Wageningen, 1951, pp. 410-14, from English abstr. in *Euphytica*, 1952, 1: 152.
- s SAITO, K.  
**Studies on inducing polyploid flower plants and their utilization. VII. A new segregation mode of double flowering plants in tetraploid stocks (*Matthiola incana*) and their utility.** [Japanese, with English summary ½ p.]  
*J. hort. Ass. Japan*, 1952, 21: 97-103, bibl. 13, illus.
- t DOS SANTOS, N. F., AND DOS SANTOS, A. C.  
Algumas notas sobre micorrizas nas orquídeas. (Some notes on mycorrhiza in orchids.)  
*Dir. Ger. Serv. Flor. Aquic. Publ.*, 1951, 18: 85-96, from abstr. in *Soils and Ferts*, 1952, 15, No. 2227.
- u SCARAMUZZI, G.  
L'alternariosi dei petali di garofano. (Alternaria disease of carnation petals.) [English summary 8 lines.]  
*Ann. Sper. agrar.*, 1952, 6: 1587-95, bibl. 3, illus.
- v SCHWANITZ, F.  
Untersuchungen an polyploiden Pflanzen. XIV. Steigerung der Blütenproduktion durch Polyploidie bei *Malva silvestris* L. ssp. *mauritanica* Thell. und bei *Eschscholtzia californica* Cham. (Investigations on polyploid plants. XIV. An increase in flower production resulting from polyploidy in *Malva silvestris* ssp. *mauritanica* and *Eschscholtzia californica*.)  
*Züchter*, 1952, 22: 338-41, bibl. 9, illus.
- w SHEWELL-COOPER, W. E.  
**The new Chabaud carnations.**  
*Comm. Grower\**, 1952, No. 2974, p. 1202.  
Now introduced into England.
- x SKINNER, F. L.  
**Propagation of roses.**  
*Rep. Proc. 8th annu. Mtg west. Canad. Soc. Hort.*, 1952, pp. 97-8.  
On the prairies.
- y WULFE, H. D.  
Zytologische Beobachtungen an Rosenbastarden (*R. canina* L. × *R. coriifolia* Fries var. *froebelii* Rehd. und *R. coriifolia* Fries var. *froebelii* Rehd. × *R. multiflora* Thunb.). (Cytological observations on rose hybrids.)  
*Züchter*, 1952, 22: 233-44, bibl. 23, illus.
- z ZAITLIN, M., AND OTHERS.  
**Rapid serological detection of virus in cattleya orchids.**  
From abstr. in *Phytopathology*, 1952, 42: 478.

\* Formerly *Fruitgrower*.

## SUB-TROPICAL FRUIT AND PLANTATION CROPS.

### General.

(See also 1510, 1511, 2372, 2382, 2396, 2400.)

2134. DE VILLIERS, G. D. B.  
**Climatology in relation to land use with special reference to the influence of climate on fruit growing.**  
[*Proc.*] *Afr. reg. sci. Conf.*, Jo'burg 1949, Vol. 2, Statements and Communications, pp. 37-41 [received 1953].

The author notes that intensive research is being carried out at the Western Province Fruit Research Station, Stellenbosch, on the relation between climate and fruit-growing, more particularly deciduous fruitgrowing. All things considered he believes that fruitgrowing in Africa in the future lies particularly in the Tropical

Highlands. This region includes the highlands of Ethiopia, Kenya, Tanganyika, Uganda, Angola, Nyasaland and Northern and Southern Rhodesia. He feels that both the Nelspruit and Stellenbosch Stations can give the greatest possible assistance in supplying the basic material necessary for early trials in those regions, in the breeding of new varieties and in soil analytical work. He stresses the urgent need for the easy movement of research workers from one territory to another.

2135. NELSPRUIT.  
*The citrus and subtropical horticultural research station, Nelspruit*, Eastern Transvaal, 1952, pp. 12.

A pictorial account of a 25-year-old research station

whose fame has been growing through the years. It has just celebrated its jubilee with the opening of new buildings including Low Temperature Laboratories, and this leaflet is in honour of the occasion.

### Avocadoes.

2136. ZENTMYER, G. A., BAKER, K. F., AND THORN, W. A.

The role of nursery stock in the dissemination of soil pathogens.

From abstr. in *Phytopathology*, 1952, 42: 478-9.

Investigations have indicated that movement of nursery material may be the primary means by which the root pathogen *Phytophthora cinnamomi* has become so widely distributed. The fungus was isolated from avocado, camellia, myrtle and heather nursery stock and from a number of coniferous species.

2137. FREZZI, M. J.

*Phytophthora cinnamomi* y su relación con la muerte de los paltos en Urundel (Salta), Argentina. (*Phytophthora cinnamomi* and its association with the death of avocado trees at Urundel (Salta), Argentina.)

Rev. argent. Agron. B. Aires, 1952, 19: 214-19, bibl. 19.

Infected trees showed decline, chlorosis and defoliation followed by reduced yield and finally death. The rot is confined to the roots, collar and lower trunk (for 50 cm. approx.) and produces large superficial dark brown patches of rot. The disease, which is considered to be *Phytophthora cinnamomi*, is more serious on impermeable clay soils and is favoured by close planting. Measures of prevention and cure are suggested.

2138. FLESCNER, C. A., AND RIKER, D. W.

The pallid mite on avocados.

Calif. Citogr., 1953, 38: 115, bibl. 1, illus.

The pallid mite, *Tydeus californicus*, formerly regarded as a predator or fungus feeder of no economic importance, has now been found feeding and reproducing on avocado leaves. The mite is therefore now being studied.

### Citrus—general.

(See also 1433, 1502, 2216e, 1, o, v, 2220, 2222.)

2139. DARCEL, F. C.

A review of recent investigations on citrus production, with particular reference to the mineral nutrition of the crop.

Trop. Agriculture Trin., 1952, 29: 77-87, bibl. 41.

This review article discusses some of the more important citrus soils of the U.S.A., and some recent findings on the moisture requirements of the crop, diseases affected by soil conditions, and recent world research on citrus nutrition.

2140. RENAUD, M.

L'agrumiculture en Espagne. (Citrus growing in Spain.)

Fruits et Prim., 1952, 22: 283-93, illus.

In Spain citrus growing is a family industry in small irrigated plantations, and the chief centres are the provinces of Castellon de la Plana and Valencia.

Oranges form 85% of the crop, the chief varieties being blood oranges, the common orange and the Washington Navel. Yields average 120-125 quintals per ha. Propagation is either by budding on sour orange or, on certain very light soils, by budding low on "Verdet" and planting with the union below ground to obtain own-rooting. Spacing is commonly at 5×5 m. Clean weeding is done by hand. Irrigation is by channels in gently sloping terraces, at the rate of 8,000-9,000 cu. m. per ha. per annum on sandy soils and 6,000 on heavier soils. Water is generally withheld between the opening of the flowers and the end of June to avoid fruit drop. Particulars of fertilizer schedules are given. Pruning is lightest in the orange, heavier in the clementine and heavier still in the mandarin. Top-working is common. Important diseases and pests are gummosis, psorosis and scale insects.

2141. (GOODALL, G.)

Lemon production costs in Santa Barbara County.

Calif. Citogr., 1952, 38: 31-2.

Itemized costs for 1951 are summarized. Total cultural costs, excluding harvesting, ranged from \$145 to \$450 with an average of \$275.53 per acre or 47 cents per field box. Taking overheads and capital charges into account total costs ranged from \$488 to \$1,003 per acre with an average of \$661.49 per acre or \$1.14 per field box. The average yield was 582 field boxes per acre compared with a 10-year average of 461. Returns indicate that a grove must produce at least 400 boxes per acre to be profitable.

### Citrus—varieties, rootstocks, propagation.

2142. ROBINSON, T. R.

Grapefruit and pummelo.

Econ. Bot., 1952, 6: 228-45, bibl. 32, illus.

The botany, history, varieties, soils and rootstocks of pummelo or shaddock, *Citrus grandis*, and grapefruit, *C. paradisi*, are described. Production, utilization and economic factors discussed relate mainly to grapefruit.

2143. NAURIYAL, J. P.

Self-incompatibility in pumelo (*Citrus maxima* Merr.).

Curr. Sci., 1952, 21: 347, bibl. 4.

Naturally selfed and hand-selfed flowers of the Chakaiya pumelo growing at the Fruit Research Station, Saharanpur, failed to set fruit, whereas cross-pollinated and open-pollinated flowers set 25 and 17.2% respectively. As the pollen showed 94.4% viability and the pistils were also fully functional it is concluded that this variety is probably self-sterile.

2144. GURGEL, J. T. A., AND SOUBIHE SOBRINHO, J.

Análise de poliembria em *Citrus*, máxima em toranjas. (Analysis of polyembryony in citrus with special reference to the pummelo.)

An. Esc. sup. Agric. "Luiz de Queiroz" Piracicaba, 1951, 8: 727-46, bibl. 26 [received 1953].

This paper, which is complementary to that abstracted in H.A., 18: 2879, discusses the number of seeds per fruit and polyembryony in certain species. In *Citrus pectinifera*, a lemon×lime hybrid, *C. histrix* an



unidentified *Citrus* sp., and pummelo (14 varieties) the number of seeds per fruit averaged 5.8, 17.3, 30.2, 94.6, and 100 respectively. In the first 4 the cotyledons were classified into 4 size grades ranging from 2 mm. to 8 mm. long. Those of pummelo were placed in 3 classes: 5-7 mm. long, 9-11 and 11-13. Embryos were counted in two ways: in the seed and after germination. The results of both methods are given in detail and their statistical implications are discussed. The results by the former method may be summarized as follows: *C. pectinifera*—90% polyembryony and average number of embryos per seed 3.28; lemon×lime hybrid—40% and 1.5; *C. hystrix*—23% and 1.3; *Citrus* sp.—0.17% and 1.0; Chinese pummelo—0.78% and 1.01. The other 13 pummelo varieties were all monoembryonic.

2145. DEAKER, E. M.

**Comparison of the ascorbic acid content of Meyer and standard types of lemons.**

*N.Z. J. Sci. Tech., Sect. B*, 1952, 34: 146-9, bibl. 4.

In tests at the Otago Medical School, Dunedin, in 1949, the common (standard) varieties (Lisbon, Eureka, Genoa, Villa Franca, etc.) were found to have a greater ascorbic acid content per unit volume of juice than the Meyer lemon (37.3 compared with 28.3 mg. per 100 ml.). But as the Meyer contained more juice the ascorbic acid content per lemon was not significantly different. Both the standard and the Meyer had more ascorbic acid in the peel than in the juice and the former had more in the peel than the latter.

2146. AHUNDZADE, I. M.

**Growing Meyer lemons under cover. [Russian.]**

*Sad i Ogorod*, 1952, No. 12, pp. 41-3.

The Meyer lemon because of its comparative frost-resistance and somewhat inferior flavour is not recommended for either trench, shed or room cultivation. A note by the editor challenges this, and, while agreeing that the quality of this variety is not up to the standard of the best lemons grown by the expensive indoor methods, when grown under cover it comes into bearing 2-3 years earlier than other varieties and has proved very suitable for trench cultivation in Odessa.

2147. ZDRUKOVSKAJA, A. I.

**Vegetative hybridization of lemon. [Russian.]**

*Bot. Zhurnal*, 1952, 37: 212-14, bibl. 8.

The material used in the experiments described consisted of rootstock plants of the winter hardy *Poncirus trifoliata* (7 and 17 years old) and *Citrus junos* (3 years old) and scions of 3 lemon varieties raised from embryos grown on a medium prepared from cotyledons of *trifoliata*. When the young seedlings growing from the embryos had developed one or two leaflets, or in some cases a few leaves, they were grafted on the crowns of trees of *Poncirus trifoliata* and *Citrus junos* as mentors. The method of removing the embryos aseptically from the fruit and the preparation of the culture medium are described. Successful results are recorded.

2148. NAUNDORF, G., AND TERREROS, J. M.

**Contribución al enraizamiento de estacas de *Citrus limon*. (Rooting lemon cuttings.)**  
*Not. agron. Palmira*, 1952, 5: 43-7, bibl. 3, illus.

In experiments at Palmira Agricultural Experimental Station, Colombia, lemon cuttings intended for use as rootstocks for orange were subjected to 8 different treatments designed to stimulate rooting. Some of these involved the use of various plant hormones and in some cases basal treatment such as trimming, notching, vertical incising and crushing was given. The best results were obtained by crushing combined with basal treatment with hormone (5 mg. 3-indolebutyric acid to 1 g. talc powder). The percentage rooting and number of roots per cutting after 25 days were 78% and 4.2, compared with 56% and 3.4 in the next best treatment and 0% and nil in the control. After 50 days the figures were 96% and 14.6, 92% and 11.4, and 60% and 5.5 respectively. Hormone treatment caused deeper rooting.

2149. DAY, B. E., AND SCHNEIDER, H.

**Stimulation of roots above overgrown lemon buds.**

*Calif. Citrogr.*, 1952, 38: 46, 58, illus.

Examination of severely overgrown unions of 40-year-old lemon trees growing probably on grapefruit stock showed that some trees were being girdled by compression of the folded bark. The bud unions were mostly at or just below ground level. In some cases scion rooting had occurred, and in others it was readily induced by girdling or chopping off pieces of bark down to the wood and smearing the cuts with lanolin. Rooting was so profuse that little improvement resulted from dissolving NAA in the lanolin.

2150. RICHARDS, A. V.

**Improvement of lime.**

*Trop. Agriculturist*, 1952, 108: 133.

Attempts are being made to improve limes by crossing these with the Mindora and seedless Tahiti limes. The Mindora is a straggly bush coming into bearing within 8 months. It is polyembryonic, and a technique has been developed [but is not fully described here] for separating the embryos and germinating them on nutrient agar or on filter paper placed on wet sand.

2151. BHATTACHARYA, S. C., AND DUTTA, S.

**A preliminary observation on rootstocks for citrus in Assam.**

*Ind. J. Hort.*, 1952, 9 (1): 1-11, bibl. 35, illus.

Twelve citrus rootstocks from 9 species were tested in the orchard for 8 years in combination with 6 scion varieties. Although the observations are based only on relatively small populations of 8-24 plants per combination, the tests have, so far, at least achieved the elimination of some generally incompatible stocks. The Soh-synteng (*Citrus limon*) emerged as the most satisfactory rootstock which proved completely compatible with the Khasi mandarin orange (*C. reticulata*), Valencia Late and Mosambi (*C. sinensis*). With Washington Navel orange and Duncan grapefruit (*C. paradisi*) it produced only medium-sized but healthy and fairly vigorous trees. The Kata jamir (*C. jambhiri*) was also promising under Assam conditions. The other stocks studied showed either general or delayed incompatibility or they were compatible

only with a few of the scion varieties.—Govt. Citrus Fruit Res. Stat., Burnihat, Assam.

2152. SINGH, SHAM.

The nomenclature and distinctive characters of some citrus rootstocks tried in the Punjab. *Indian J. agric. Sci.*, 1951, 21: 1-9, bibl. 7, illus. [received Dec. 1952].

Detailed descriptions, accompanied in each case by plates, largely in colour, of fruits, flowers and leaves, are given of the following citrus varieties that have been under trial as rootstocks in the Punjab since 1932: Kharna khatta (*Citrus karna*), Jatti khatti (rough lemon), Jamberi (often confused with, but distinct from, rough lemon), Jullunduri khatti (a smooth lemon deserving a separate specific name), Mokari (citron), Khatta (sour orange), Mitha (a form of sweet lime), and Nasnar(ay)an (a Ceylon variety). Various synonyms used in different parts of India are recorded.

2153. SLEETH, B., AND WAIBEL, C.

Comparisons of budding Cleopatra and sour orange seedlings.

*Proc. 7th Annu. Rio Grande Valley hort. Inst.*, 1953, pp. 39-41, bibl. 1.

In 3 trials in different years Cleopatra mandarin seedlings showed much higher mortality after planting out in nursery rows than sour orange seedlings. On the other hand, the surviving mandarin seedlings showed somewhat higher bud takes in each case than the sour orange seedlings.

2154. BLONDEL, L.

Technique du greffage des agrumes. (Topworking citrus [in Algerial].) *Fruits et Prim.*, 1952, 22: 244-50, bibl. 14, illus.

Four methods are in common use in Algeria: crown grafting, side grafting, shield budding and patch budding. Crown grafting, though popular, is not recommended as it is risky in hot or windy areas. In side grafting, which has been practised successfully at Boufarik experimental station for 3 years, unwanted framework branches are first removed, leaving 3-4 principal branches. 2-3 scions from 1- to 2-year-old ripened shoots are grafted on each retained branch either in April/May or at the end of summer. Afterwards a ring of bark 3-5 mm. wide is removed from the branch 15-20 cm. above the grafts. The branches are subsequently shortened by stages, the stumps acting as a prop for the scions and being finally removed after 3-4 years. Shield budding is not recommended as a normal practice but can be employed on water-sprouts if crown grafting fails. In patch budding, which is much used in western Algeria, unwanted framework branches are eliminated as in side grafting. Patches from 2- to 3-year-old branches of at least 5-6 mm. in diameter should be used. The technique is described. The advantages and disadvantages of each method of reworking are discussed and it is stressed that the trees to be treated should be healthy. Recommendations made for the after-care of treated trees include white-washing as a protection against the sun and the removal of water-sprouts. Topworking costs less than replanting and yields of 80-100 quintals/ha. are obtainable from the 3rd or 4th year.

*Citrus—environment, cultivation, irrigation.*

(See also 2216a.)

2155. SLEETH, B.

An old-citrus-soil problem in the Lower Rio Grande Valley.

*Proc. 7th Annu. Rio Grande Valley hort. Inst.*, 1953, pp. 31-2, bibl. 4.

Substantial growth increases of citrus seedlings in old citrus soils following fumigation with D-D at the low rate of 800 lb. per acre suggest that the replanting of citrus on old citrus land presents a problem in Texas similar to that encountered in California.

2156. KVARACHELIA, N. T., AND BERDZENŠVILI, L. I.

Row culture of perennial grasses in citrus groves. [Russian.]

*Sad i Ogorod*, 1952, No. 11, pp. 42-3.

A mixture of Timothy grass and clover, sown as a permanent cover crop under young lemon and mature mandarin trees, during a 3-year trial was found to have a favourable effect on the growth and development of the trees. It reduced the nitrate content of the soil, prevented its overheating in the summer, improved moisture retention and increased yields as compared with controls, which were clean cultivated during the summer and sown to winter cover crops.

2157. (GRIFFITH IRRIGATION RESEARCH STATION.)

Research basis for irrigation.

*Fruit World*, Melbourne, 1952, 53 (8): 33-6, illus.

The soil management of citrus orchards, irrigation practices and other problems are discussed in this review of some important findings from the Irrigation Research Station, Griffith, N.S.W.

2158. TRUMBLE, H. P. C.

Improved irrigation programmes for citrus.

*J. Dep. Agric. S. Aust.*, 1952, 56: 133-9, illus.

A survey of River Murray citrus orchards was made in an attempt to establish a connexion between heavy December drop and environmental factors. The survey showed that the irrigation of citrus on many blocks can be improved in two ways: (a) by closer attention to the timing of irrigation, and (b) by increased efficiency in applying water by making furrows closer to the butts of the trees. Efficient irrigation results in greater average fruit size and prevents partial defoliation. It is necessary to avoid even short periods of moisture stress in early summer (October to mid-November) if excessive December drop is to be prevented.

2159. ALDERMAN, D. C.

A survey of freeze damage to citrus trees in the Lower Rio Grande Valley and its effect upon fruit quality.

*Proc. 7th Annu. Rio Grande Valley hort. Inst.*, 1953, pp. 35-8.

Evaluations of fruit in 4 orange and grapefruit groves following a sharp radiant type freeze in December 1950 indicate that the freeze resulted in inferior flavour and texture, an increase in the quantity of hesperidin crystals in oranges and a slight lowering of soluble solids in the juice. Except for the soluble solids, the effects on quality were more pronounced in fruits from the outside of the trees than in inside fruits.



2160. ADAMS, R. L.  
Protecting citrus groves from frost. Costs and benefits to growers.  
*Bull. Calif. agric. Exp. Stat.* 730, 1952, pp. 61.

Experience to date has shown that a combination of wind machine and heater affords the maximum protection from frost, heaters being chiefly necessary on cold, clear nights. Detailed notes are given on various types of heaters and wind machines, when to protect, coverage, costs and the choice of machines. Freezing begins at 29.5°–30.5° F. in small green lemons (less than  $\frac{1}{2}$  in. diameter), 28.5°–29.5° F. in larger green lemons, 29.5°–30.5° F. in tree-ripe lemons, 28.5°–29.5° F. in green oranges, 28°–29° F. in half-ripe oranges, and 27°–28° F. in ripe oranges. The air temperatures at which heaters should be lit are given and are mostly the lower limit quoted or 1° F. below it. Wind machines should be started at 27°–32° F. for oranges and 30° F. for lemons. Heaters used with wind machines should be lit at 26°–28° F. for oranges and 28°–30° F. for lemons.

2161. UEHARA, M., AND ISOZAKI, Y.  
Micrometeorological observation on the protection of Satsuma orange (*Citrus unshiu* Marc.) trees against cold. I. [Japanese, with English summary  $\frac{3}{4}$  p.]  
*Tech. Bull. Kagawa agric. Coll.*, 1952, 4: 56-60.

In a study conducted in the winter of 1951 in a Satsuma orange plantation on a slope a crescent-shaped wind-break 2 m. high was erected on the north/southwest side of a tree 1.7 m. high and at a distance of 1.65–2.18 m. from its trunk. The effects of this on the horizontal and vertical distribution of the lowest temperature and on the horizontal distribution of evaporation are shown in graphs.

2162. LAVRIČUK, I. I.  
A new method of growing citrus in non-subtropical regions. [Russian.]  
*Sad i Ogorod*, 1952, No. 10, pp. 32-5, illus.

The leaves of citrus trees grown in trenches after 4 months under winter cover in total darkness were found intact. Trench cultivation is, however, very laborious, and a new method of protecting prostrate lemon trees is suggested, by placing tents or semi-circular wooden structures covered with plant debris and soil over the plants.

2163. COURANJOU, A.  
Tailler ou ne pas tailler les agrumes. (*Citrus* pruning [in North Africa].)  
*Fruits et Prim.*, 1952, 22: 258-60, illus.

Opinions differ about the necessity for pruning citrus but the Mediterranean species, especially the mandarin, are by nature alternate-year croppers and do require pruning. The principles are: construct a good framework and an open centre; prune lightly after a heavy yield and *vice versa*; cut cleanly, leaving no stumps; cut back central water-sprouts to encourage branching and remove those which are too close to their neighbours; encourage replacement wood outside and at the top of branches, removing old non-vigorous wood and employing outward-growing water-sprouts. In clementines pruning can be more moderate than in

mandarins and opening up for light is unnecessary unless shoots are being suppressed. In oranges pruning consists of the treatment of water-sprouts (the suppression of axial ones and the selection of others for framework and fruiting branches and replacement wood), and ventilation is seldom required. American varieties of orange such as Navel, Valencia and Hamlin require removal of dead and dying wood and the thinning of dense parts to encourage shooting and replacement wood; water-sprouts should be suppressed if central and encouraged if external.

### *Citrus—tree composition and nutrition.*

(See also 2216d, s.)

2164. PEARSON, G. A., AND GOSS, J. A.  
Observations on the effects of salinity and water table on young grapefruit trees.  
*Proc. 7th Annu. Rio Grande Valley hort. Inst.*, 1953, pp. 1-6, bibl. 2, illus.

Young Ruby red grapefruit trees on Cleopatra mandarin stock established in lysimeters were subjected in April 1952 to 12 replicated treatments involving all combinations of 4 water tables and 3 levels of salinity in irrigation water. In general a high water table (1-2 ft. below the surface) caused a distinct mottling of the leaves. High salt concentrations (tap water with 300 p.p.m. salt plus 2,000 or 4,000 p.p.m. of a 50-50 mixture of Na and Ca chlorides) caused bronzing and burning of leaves and the highest concentration also caused defoliation and twig die-back. High water tables, especially those that fluctuated frequently, accelerated the adverse effects of high salt concentrations.

2165. COOPER, W. C., AND PEYNADO, A.  
A comparison of sour orange and Cleopatra mandarin seedlings on salty and calcareous nursery soils.  
*Proc. 7th Annu. Rio Grande Valley hort. Inst.*, 1953, pp. 95-101, bibl. 12.

The results are reported of a preliminary investigation of young Cleopatra mandarin rootstocks showing chlorosis under conditions in which sour orange stocks were either healthy or showed tip or marginal bronzing or burning of the leaves. Soil analyses showed the mandarin chlorosis to be associated with lime, though no quantitative relationship could be established between percentage  $\text{CaCO}_3$  and the extent of chlorosis. No relationship was found between total soluble salts in the soil and the incidence of chlorosis. Leaf analyses showed no clear or consistent relationship between chlorosis and Cl, Na or Ca contents. There was markedly less K in the mandarin leaves than in the sour orange leaves regardless of the incidence of chlorosis. Slightly more K was found in green than in chlorotic mandarin leaves. These results are discussed in the light of experience in other parts of the U.S.A.

2166. COOPER, W. C., AND SHULL, A. V.  
Salt tolerance of and accumulation of sodium and chloride ions in grapefruit on various rootstocks grown in a naturally saline soil.  
*Proc. 7th Annu. Rio Grande Valley hort. Inst.*, 1953, pp. 107-17, bibl. 8.

Studies were made on Shary Red grapefruit on 67 different rootstocks, planted in 1950 on a fine sandy loam with a calcareous sub-soil and irrigated with Rio

Grande water containing sulphates, bicarbonates and chlorides of Na, Ca and Mg. Leaf samples, taken on two dates, were analysed for Na and Cl ions. Na and Cl accumulation among the groups of rootstocks varied greatly. Cl concentrations were generally lowest in the mandarins, higher in the sweet oranges and highest in trifoliate orange hybrids, whereas Na concentrations were lowest in the sweet oranges, higher in trifoliate hybrids and highest in the mandarins. There were also variations within the groups. With certain trifoliate hybrid stocks leaf tip burn and defoliation were correlated with high leaf Cl. The cause of a necrotic leaf spot that was common with many stocks in May but had disappeared by the following January was not determined. Poor survival following a frost in January 1951 of trees on certain mandarins and trifoliate hybrids was associated with a high accumulation of Cl and Na ions by those trees. [For an account of other work on this subject, see *H.A.*, 23: 1109.]

2167. ALI, S.

Some experiments on the manuring of citrus in the Punjab.

*Punjab Fruit J.*, 1952, 15 (53): 1-12.

The experiments were conducted at Attari in East Bengal in 1944-6. *Sweet oranges* 1944-6. The varieties used were blood, Valencia late, pineapple, Hamlin and common. The 4 treatments were farmyard manure (100 lb. in February, 1944, 86 lb. in January, 1945), sulphate of ammonia (2·128 lb. in March and again in April 1944, 2·75 lb. in February and in April 1945), FYM plus sulphate of ammonia (50 lb. plus 1·064 lb., in February and again in March-April 1944, 43 lb. plus 1·375 lb. in two equal doses in 1945), and nil. The treatments had no significant effect on girth. Sulphate of ammonia, and FYM plus sulphate of ammonia gave significantly higher yields than FYM and control. Sulphate of ammonia thickened the peel slightly. Juice content and total solids were higher with FYM plus sulphate of ammonia than with other treatments. *Mandarins* 1944-6. Five varieties were used. The treatments were green manuring with two different crops, and nil. Neither green manure produced a significant effect on girth, yield or fruit quality. *Grapefruit* 1945-6. The varieties used were Foster, Duncan, Poona Budded and Marsh Seedless. The treatments were NP (2·75 lb. sulphate of ammonia and 1·268 lb. superphosphate in February and again in April), NK (2·75 lb. sulphate of ammonia and 1·6 lb. potash in February and again in April), and NPK (2·75 lb., 1·268 lb. and 0·802 lb. respectively, in February and again in April). These had no significant effects on girth, yield or quality except that NP gave a significantly higher percentage total soluble solids than the others.

2168. JONES, W. W., AND STEINACKER, M. L.

Leaf sprays of urea as a source of nitrogen for citrus trees.

*Calif. Citrogr.*, 1953, 38: 84, 107, bibl. 4.

The results of several trials on Valencia oranges are given which indicate that leaf N is increased as the concentration of urea in sprays is increased, but that leaf injury, taking the forms of burning and "yellow tip", is also apt to increase with the concentration of urea. Adding sucrose to urea prevents injury but reduces the absorption of urea. Growers are advised to try spraying only a few trees at first, using 5 to 7½ lb.

urea per 100 gal., applied between 1 January and the beginning of spring growth.

2169. BEYERS, E., AND JOUBERT, G. F.

Mineral deficiencies in citrus in the Citrusdal area.

*Fmg S. Afr.*, 1952, 27: 508-10, illus.

Citrus soils at Citrusdal are generally acid sands of low fertility and deficiencies of Cu, Zn, Mg and Mn are common. Cu deficiency is the most serious and can be controlled by soil applications of 2 oz. to 1 lb. Cu sulphate per tree either broadcast or in 4 to 8, 15-inch-deep, holes staggered round the drip of the tree; Cu sulphate plus compost has greatly improved tangerine juice content; leaf sprays gave very unsatisfactory responses. Zn deficiency, which is also of major economic importance, can be controlled by a leaf spray of 3-5 lb. Zn sulphate and half that weight of hydrated lime per 100 gal. water applied during the spring-growth flush and repeated 1-2 months later if necessary. Mg deficiency is widespread but its effect on yield is not yet certain. It is often reduced by the application of N fertilizers. The best control for Valencias was a single spray in November of 20 lb. Mg sulphate plus 10 lb. hydrated lime per 100 gal. water. Mn deficiency is common but generally not serious, and a leaf spray (preferably with a wetting agent) of 2 lb. Mn sulphate per 100 gal. water gives good control. Suitable combined treatments are a mixture of 3 lb. each of Zn and Mn sulphate and hydrated lime (or 5: 5: 5) per 100 gal. water; or, for a limited number of trees, 1 lb. each of Cu and Mn sulphate (per large tree) plus compost applied in holes round the tree.

2170. STEWART, I., AND LEONARD, C. D.

Chelates as sources of iron for plants growing in the field.

*Science*, 1952, 116: 564-6, bibl. 11, illus., being *Fla agric. Exp. Stat. J. Ser.* 74.

Literature on Fe deficiency in plants and its correction is discussed. Single applications to the soil of Fe chelated with sodium ethylenediamine tetraacetate brought about complete greening of chlorotic orange and grapefruit leaves within 6 weeks. As little as 6 g. chelated Fe per tree produced a considerable response. Two months after the application of 10 or more grams chelated Fe the total Fe in orange leaves rose from 40 p.p.m. in untreated trees to 85-100 p.p.m., whereas leaves on trees supplied with 2,500 g. Fe as ferrous sulphate only contained 50 p.p.m. Fe. It is suggested that the soluble chelate makes intimate contact with the roots which are able to take up the Fe from the complex by ion exchange. Studies are now in progress on other metal complexes. [For another account, see *H.A.*, 23: 1144.]

2171. STEWART, I., AND LEONARD, C. D.

Molybdenum deficiency in Florida citrus.

*Nature*, 1952, 170: 714-15, bibl. 6, illus.

Molybdenum—the 12th addition to the list of citrus nutrients.

*Citrus Mag.*, 1953, 15 (5): 35-8, bibl. 7, illus.

Molybdenum deficiency has been found in Florida to be the cause of yellow spot in citrus, which appears to be particularly prevalent in trees grown on grapefruit stocks, less so in those on sour orange and least in those



on rough lemon. The trouble can be corrected by 1 spray per annum of sodium or ammonium molybdate at 1 oz./100 gal., 10 gal. being applied per tree. Mo appears to be compatible with most other spray materials. Only leaves wetted by spray turn green; Mo is not translocated to the older leaves but moves from older leaves to the new growth flush. Mo absorption by the trees increases with increasing pH; thus, whereas grapefruit trees growing on soil of pH 4.2 were severely affected by yellow spot and contained only 0.03 p.p.m. in their leaves, adjoining trees on repeatedly limed land of pH 5.6 were healthy and showed leaf Mo contents of 0.06 p.p.m. Mo is not absorbed readily by citrus fruits, but to avoid the risk of toxic concentrations occurring in peel fed to cattle Mo sprays should only be used when yellow spot appears. This is thought to be the first diagnosis of Mo deficiency in trees growing in soil.—Citrus Exp. Stat. Fla. [See also *H.A.*, 23: 1145.]

### *Citrus—growth substance sprays.*

2172. STEWART, W. S., RIEHL, L. A., AND ERICKSON, L. C.

Effects on citrus of 2,4-D used as an amendment to oil sprays.

*J. econ. Ent.*, 1952, 45: 658-68, bibl. 18.

From 1946 to 1949, 63 replicated field experiments were conducted in California to determine the effects of 2,4-D added at concentrations of 0.8 to 8.0 p.p.m. to oil sprays used for citrus pest control. The trees, from 7 to 50 years old, included Washington Navel and Valencia oranges, grapefruit and lemon. It was found that the addition of 4 or 8 p.p.m. 2,4-D increased the yield of Navel orange and grapefruit trees; reduced mature fruit drop from Navel orange and lemon trees; was more effective in reducing drop of sound Navel oranges than of cull fruits; reduced immature fruit drop from Navel oranges; reduced leaf drop from both orange and lemon trees; increased the percentage of total soluble solids in the juice of grapefruit over that of grapefruit sprayed with oil alone; caused deformation of young leaves without, however, lowering yields or quality; did not affect the yield of Valencia oranges. The addition of 2,4-D to the oil sprays, to counteract fruit drop caused by the oil, appeared more effective than separate 2,4-D application. Notes are given on results with 2,4-D oil sprays applied at other seasons than the customary late summer spray period. [From authors' summary. See also *H.A.*, 22: 1796, 2959; 23: 1148, 1149.]

2173. ERICKSON, L. C., AND OTHERS.

Responses of orange and grapefruit trees to maleic hydrazide.

*Bot. Gaz.*, 1952, 114: 122-30, bibl. 3, illus., being *Pap. Calif. Citrus Exp. Stat.* 731.

1. Maleic hydrazide (MH) spray delayed spring growth of Valencia orange and grapefruit trees when applied during late winter at concentrations of 1,000 p.p.m. or 500 p.p.m. but not at 100 p.p.m. 2. Fruit of Valencia orange trees sprayed in late winter showed a correlation between the concentration of MH in the spray and the total soluble solids in the juice. Other factors of fruit quality were not apparently altered. No effects were noted in the quality of fruit from sprayed grapefruit trees. Fruit of the succeeding crop of Valencia oranges

had a smaller mean diameter. 3. Fruit of Washington Navel orange trees sprayed with MH at bloom or later showed a reduction in mean fruit size, but there was more fruit per tree on sprayed than on unsprayed trees. Severe modifications of fruit in the form of thickened peel and absence of juice vesicles were found in small fruit from trees sprayed at bloom. The quality of the fruit from trees sprayed at bloom was altered, and off-flavour was detected. When trees were sprayed several weeks after bloom, no effects on quality of fruit juice were noted. [Authors' summary.]

2174. KUROKAMI, T., AND OTHERS.

Studies with phytohormone treatments in controlling calyx abscission of summer oranges. [Japanese, with English summary 11 lines.]

*Tech. Bull. Kagawa agric. Coll.*, 1952, 3: 130-4, bibl. 21.

In experiments on the control of calyx abscission during storage calyx sprays with 32-40 p.p.m. solutions of 2,4-D or of 2,4,5-T plus 2,4-D appeared the most effective for the Iyomikan variety but were quite ineffective for the Hassaku variety of summer orange.

### *Citrus—diseases and pests.*

(See also 2216c, g.)

2175. BIOLOGICAL BRANCH, N.S.W. DEPARTMENT OF AGRICULTURE.

Some abnormalities of citrus.

*Agric. Gaz. N.S.W.*, 1952, 63: 592-5, illus.

Short descriptions, with illustrations, are given of wind injuries, cold injuries, leaf crinkle of Wheeny grapefruit, granulation, puffiness, oleocellosis, hail injury and water spot, as observed in citrus in New South Wales.

2176. CHEVALIER, G.

La boursouffure des agrumes. (Puffiness in citrus fruit.)

*Fruits et Prim.*, 1952, 22: 339-43.

Experiments in Algeria suggest that puffiness of oranges and mandarins, a condition in which the fruits are soft, flaccid and larger than normal and the skin becomes detached in places from the flesh which is somewhat dry, is associated with senility. The condition is favoured by high Ca/K and Ca/K plus Mg ratios and is commoner in years with a high mean temperature when the fruit is often picked at a more advanced stage of maturity than usual. It is more prevalent in the "common" orange which is often picked when over-mature, than in the early Navel or the late maturing Vernia and Valencia Late oranges.

2177. CHAPOT, H.

Le "quick decline" existe en Floride et peut-être aussi à Madagascar. (Quick decline exists in Florida and perhaps also in Madagascar.)

*Fruits d'Outre Mer*, 1952, 7: 476-7.

The grounds upon which it is concluded that the disease is present in Madagascar are: (1) the importation in 1928 of citrus, chiefly oranges, from South Africa, whence the virus spread to certain other African territories; (2) the decline with virus symptoms of the imported plants which were grafted on shaddock or grapefruit, these being susceptible when used as rootstocks for orange; (3) normal growth of the original

diseased plants after approach grafting on combava (a Madagascar form or hybrid of *Citrus hystrix*); and (4) normal growth of plants consisting of scions from diseased trees grafted on combava rootstocks.

2178. BITTERS, W. P.

**Stem pitting in citrus trees.**

*Calif. Citogr.*, 1952, 38: 3, 26, bibl. 8, illus., and shorter account in *Calif. Agric.*, 1953, 7 (1): 9, 14, illus.

The stem pitting symptom of the quick decline virus complex was first observed in California in 1952 in Morton citrange stock budded with Valencia orange. The significance of this discovery is discussed in the light of experience in other countries.

2179. KNORR, L. C., AND BEÑATENA, H. N.

**Xyloporosis en mandarino común de Concordia. (A case of xyloporosis in the common mandarin in the Concordia district [of Argentina].)**

*Idia*, 1952, No. 57, pp. 19-20, bibl. 3, illus.

Xyloporosis was first recorded in Argentina in 1938 and it is acquiring considerable importance in the Corrientes district, where many plantations on sweet lime rootstocks are seriously attacked. A single case of the disease on common mandarin (an 18-year-old tree) was recently observed in the Concordia district. The characteristic protuberances on the inside of the bark and corresponding holes in the wood (accompanied by a suppression of shooting and the drying of external branches of the crown) were situated just above the union, and the part of the trunk consisting of the sweet orange rootstock showed no signs of disease. From the situation of the internal symptoms it seems that infection may have occurred when the tree was quite young, probably at the time of grafting, and if so it must have taken place before the disease was first recorded in the country. This confirms the suggestion that the disease was introduced from South Africa in the same material as tristeza.

2180. BITTERS, W. P.

**Exocortis disease of citrus.**

*Calif. Agric.*, 1952, 6 (11): 5-6, illus.

Exocortis, which involves shelling or scaling of the bark of trifoliate orange, is common in most areas where this species is used as a rootstock. The results are reported of an examination of about 100 different combinations involving trifoliate orange or its hybrids (several citranges) grown as roots or tops or as seedlings or cuttings. Exocortis was found in only a few combinations involving certain strains of Eureka lemon, Temple orange and Valencia orange. It would seem probable that the disease is not due to inherent factors but may be of a virus nature.

2181. CALAVAN, E. C., AND SUFFICOL, J. R.

**Renewal of shell-barked lemon trees by pruning.**

From abstr. in *Phytopathology*, 1952, 42: 512.

Lemon trees which deteriorated from severe shell bark (dry bark) may usually be renewed by heavy pruning. Near Ventura, California, 93% of 1,123 badly diseased Eureka lemon trees pruned February to July, 1948, responded satisfactorily within 10 months. In August, 1951, 76% remained in fair or good condition. Addi-

tional pruning was done when necessary. The most satisfactory pruning height for diseased trees was 5½ to 8 ft. The most favourable response was obtained from trees pruned during the period of March to July, inclusive. Autumn or winter pruning predisposed diseased trees to severe frost damage.

2182. CALAVAN, E. C., AND SUFFICOL, J. R.

**Renewing lemon trees.**

*Calif. Citogr.*, 1952, 38: 2-3, 14-17, bibl. 5, illus.

The term "dry bark" of lemons is applied to the dry and dead bark of lesions, that appear to start in a manner similar to those of shell bark, but fail to flake off because the bark is killed to, or nearly to, the wood by the action of several fungi occurring separately or together. These fungi include *Diaporthe citri*, *Botrytis cinerea*, *Botryosphaeria ribis* and *Diplodia* spp. In several trials described here most dry bark affected trees responded well to heavy pruning, provided they had not passed from the declining to the collapsing (wilting) stage. In most cases it was necessary to remove 40% or more of the tops to obtain a good response. The best period for pruning was March-June inclusive. July and August were also generally satisfactory, but autumn and winter pruning was apt to be followed by severe frost damage. The results suggest that recovery is short-lived and that de-headed trees will need annual pruning thereafter to restrict their height. Where orchards are to be kept in production for more than 6 years it is suggested that severely weakened trees should be replaced.

2183. STEPANOV, K. M., AND ŠUMAKOVA, A. A.

**Periods of infection of lemon trees by mal secco disease. [Russian.]**

*Doklady vsesojuz. Akad. sel'sk. Nauk*, 1952, 17 (11): 34-8, bibl. 5.

From trials conducted on lemon trees of the variety Novogruzinskii it appears that in the Soviet Subtropics the worst periods for infection by mal secco, *Deuterophoma tracheiphila*, are the autumn and most of the winter and spring. Summer infections are much less frequent as the result of increased resistance to infection during that season, and of high temperature preventing the formation of pycnidia. Control measures are briefly discussed.

2184. OLSON, E. O., AND WAIBEL, C. W.

**Rio Grande gummosis in relation to diplodia infection in Texas citrus.**

*Proc. 7th Annu. Rio Grande Valley hort. Inst.*, 1953, pp. 84-94, bibl. 18.

From the inoculation studies reported here in detail it is concluded that infection by *Diplodia natalensis* is related to Rio Grande gummosis, but the evidence is not adequate for this organism to be considered the sole cause of the disease. The protection of pruning wounds against infection and the improvement of tree vigour by better soil and water management are recommended control measures.

2185. OLSON, E. O., AND GODFREY, G. H.

**Cotton root rot of various citrus rootstock seedlings.**

*Proc. 7th Annu. Rio Grande Valley hort. Inst.*, 1953, pp. 25-30, bibl. 9.

In 3 collections of citrus rootstock seedlings planted in



soils infested with *Phymatotrichum omnivorum*, sour orange proved highly resistant. Among other types some deaths occurred in pummelo, shaddock, sweet orange, Cleopatra and other mandarins, tangelo, lemon, trifoliate orange, Rangpur lime, limequat, citrange, citrumelo, *Citrus nobilis* and *Severinia buxifolia*. More extensive trials will be needed, however, to determine the relative susceptibility of species and varieties.

2186. HALMA, F. F., AND OPITZ, K. W.

**Observations on foot rot of orange trees.**

*Calif. Citrogr.*, 1952, 38: 41, illus.

From the trial reported here briefly it would appear that Navel orange raised from cuttings is much more susceptible to attack by *Phytophthora citrophthora* than either Valencia orange raised from cuttings or seedling sweet oranges of mixed origin budded with either of these two varieties.

2187. CALAVAN, E. C., AND OTHERS.

**New sprays for control of brown rot of citrus.**

*Calif. Citrogr.*, 1952, 38: 77.

Among non-copper sprays that have given satisfactory experimental control of brown rot are Orthocide 406 at 2 lb. per 100 gal. and Ferric-Zinc-Dithane ( $\frac{3}{4}$  lb. ferric sulphate and  $\frac{3}{4}$  lb. zinc sulphate containing 22.7% Zn, dissolved in 100 gal. water to which is added 3 qts Dithane D-14). Several new copper-containing compounds that have given control are also mentioned.

2188. CALAVAN, E. C., AND OTHERS.

**Control of brown rot of lemon fruits by various fungicides.**

From abstr. in *Phytopathology*, 1952, 42: 512.

Twenty-five different fungicides were applied to lemon trees in November 1951 in trials for the control of *Phytophthora citrophthora*. After 10 weeks and 15.85 in. of rain, the six materials (lb. per 100 gal. in brackets) giving the best control in descending order were: Orthocide 406 (4), Orthocide 406+Z-1 spreader (2-0.25), Crag 640 (2), Zinc-copper lime (2-1-2), bordeaux mixture (3-3), Copper A compound+lime+Dupont spreader-sticker (1.5-3-0.125). Orthocide 406, which was not injurious at the 2 lb., and only slightly so at the 4 lb. level, provided the best field control thus far obtained from a non-copper material. Copper-containing materials injured the foliage in varying degree.

2189. CHOWDHURY, S.

**Some observations on citrus canker in Assam.**

*Sci. and Cult.*, 1952, 18: 246-8, illus.

Canker, caused by *Xanthomonas citri*, is one of the most serious diseases of citrus in Assam. Usually it has its virulent phase during the rains from May to September, being practically absent during the rest of the year. Great differences in susceptibility are found to exist between species and varieties. Three years' trials showed that the disease is effectively controlled by (1) thorough pruning of affected twigs, (2) frequent applications of bordeaux or other fungicides in which each new flush of leaves must be covered, and (3) soil sterilization with a flame thrower (under wet conditions) before the onset of the first flush of leaves. The working of susceptible varieties on resistant stocks did not

affect the susceptibility of the scion variety.—Plant Path. Lab., Jorhat, Assam.

2190. ENTOMOLOGICAL BRANCH, N.S.W. DEPARTMENT OF AGRICULTURE.

**Citrus aphids (*Toxoptera aurantii* and *Aphis citricidus*).**

*Agric. Gaz. N.S.W.*, 1952, 63: 491-2, illus.

These two species of black aphid are present to some extent every year in the coastal regions of New South Wales, where they infest the young growth of citrus trees during spring and autumn. They may be controlled by spraying with nicotine sulphate 1 pint and soft soap 5 lb. (or white oil emulsion  $\frac{1}{2}$  gal.), in 100 gal. water, or with either DDT (1 pint of 20% emulsion to 5 gal. water) or HETP ( $\frac{1}{2}$  pint in 100 gal. water).

2191. FLESCHNER, C. A.

**Host-plant resistance as a factor influencing population density of citrus red mites on orchard trees.**

*J. econ. Ent.*, 1952, 45: 687-95, bibl. 7, being *Pap. Calif. Citrus Exp. Stat.* 726.

It is shown that the degree of host resistance of citrus trees to citrus red mite, *Paratetranychus citri*, attack ranges from almost complete immunity to marked susceptibility. There are indications that deposits of field dust and zinc and DDT sprays lower the host resistance to mite attack. Further observations suggest that DDT sprays produce some change within the citrus leaves which causes a lowering of the host resistance some time after the application, and that these changes are translocated from older to younger leaves. Interspecific variation in host resistance was noted. Young citrus leaves tended to be less resistant to mite attack than older leaves. Natural enemies gave good control of mites even on trees with relatively low resistance.

2192. JEPSON, L. R., JESSER, M. J., AND COMPLIN, J. O.

**Tree trunk application as a possible method of using systemic insecticides on citrus.**

*J. econ. Ent.*, 1952, 45: 669-71, bibl. 10.

Systox (50% emulsive) applied to trunks of lemon and orange trees at rates from 0.5 to 6.0 oz. per tree resulted in a high mortality of citrus red mite, *Paratetranychus citri*, on the leaves and fruit and some mortality of citrus bud mite, *Aceria sheldoni*, on buds. Methods of application, including banding, painting and spraying the trunks, are described, and resulting mite mortalities are given. Schradan applied by the same methods was found less effective than Systox.

2193. CHATURVEDI, P. L.

**Biology and control of fruit sucking moths of citrus in the Uttar Pradesh.**

*Agric. Anim. Husb. U.P.*, 1950/51, 1 (7/8): 21-3 [received Dec. 1952].

Ripening fruits of several citrus varieties and guavas are subject to severe attacks in Uttar Pradesh by the adults of 4 species of sucking moth, *Othreis materna*, *O. fullonia*, *Calpe emarginata* and *Achaea janata*. The life histories of the moths are outlined. Control measures listed that proved ineffective included hand catching, light traps, bait traps, deterrent sprays of fish oil rosin soap and DDT sprays. Good control resulted, however, when larval food plants within a half-mile

radius of a grove were suppressed at fortnightly intervals.

2194. RYBIN, V. A.

**DDT for the control of soft scale.** [Russian.]

*Sad i Ogorod*, 1952, No. 12, pp. 44-5.

An emulsion containing 80 g. of soft soap, 6 g. DDT (100%) and 150 c.c. kerosene in 10 l. water gave very satisfactory control of soft scales [*Coccus hesperidum*] infesting citrus, growing both in trenches and under glass. The emulsion was also used successfully for treating cacti and other sub-tropical plants.

2195. EWART, W. H., AND OTHERS.

**Control of citrus thrips with dieldrin.**

*J. econ. Ent.*, 1952, 45: 578-93, bibl. 48, illus., being *Pap. Calif. Citrus Exp. Stat.* 723.

Results obtained in California over a 3-year period with dieldrin sprays applied for the control of citrus thrips, *Scirtothrips citri*, to prevent fruit scarring on navel oranges and grapefruit, and to protect new vegetative growth on lemons are presented. It was found that 0.5 lb. of dieldrin in 100 gal. per acre prevented fruit scarring in heavily infested groves and protected new growth on lemons for 8 weeks or longer in moderately infested groves and 4 to 6 weeks where heavy thrips populations occurred. The addition of sugar did not improve the effectiveness of dieldrin sprays, that of other insecticides reduced it. Commercial dosages of zinc oxide or zinc sulphate, applied for Zn deficiency, could, however, be added to dieldrin without reducing its efficiency. From residue determinations it would appear that 1 or 2 treatments of dieldrin will result in an average of less than 0.5 p.p.m. apparent dieldrin in the peel and no detectable amount in the pulp of fruit harvested at least 30 days after the last application. There was no evidence that scale populations increased as a result of dieldrin applications.

2196. STEARNS, C. R., JR., AND OTHERS.

**Methods of applying insecticide with different spray machines.**

*Citrus Mag.*, 1952, 15 (4): 34-7, bibl. 3.

Further trials on citrus in Florida in 1951-52 have confirmed earlier results, which indicated that dilute sprays could be satisfactorily replaced by concentrate sprays in which the gallonage was reduced to one-eighth and the concentration increased only 6-fold with a consequent saving of 25% in materials [see *H.A.*, 23: 1172]. Lead arsenate and ovotran have been added to the list of materials that can be thus applied. Concentrate lead arsenate sprays were as effective as dilute sprays in lowering the citric acid content of seeded grapefruit. The necessity for further trials with certain of the machines used is, however, indicated.

**Citrus—harvesting, packing, storage and by-products.**

(See also 2216f, k, m, u.)

2197. KLOTZ, L. J., AND DEWOLFE, T. A.

**Steam sterilization of citrus boxes.**

*Calif. Citogr.*, 1952, 38: 68.

Exposure of citrus boxes for 10 and 20 seconds to steam at 194-210½° F. killed all cultures of *Sclerotinia sclerotiorum* and *Alternaria citri*, but a 30-sec. exposure was

needed to destroy *Trichoderma lignorum*, now a major parasite of stored lemons, and the two *Penicillium* spp. It is considered that a 30-sec. exposure would also be fatal to all insect pests.

2198. TINDALE, G. B.

**Citrus storage.**

*Citrus News*, 1952, 27: 161.

Six factors were examined in 1952 in Washington Navel oranges stored at 45° F. and examined for penicillium mould wastage after 1, 2 and 3 months. Contrary to previous experience, oil-spraying did not increase wastage as compared with fumigation. Sweating prior to packing did not reduce wastage appreciably. There was little difference in wastage between fruits picked from trees showing mould at harvest and others showing none, though the lower fruits from trees showing mould showed slightly more wastage than the upper fruits. Dipping in Brytene 1 vol., water 3 vols. plus 4% borax plus 2% boric acid was very effective in reducing wastage, especially during the first 2 months. Wrapping in diphenyl wraps was as effective as dipping during the first 2 months and more so in the third month; the wraps did not taint the fruit. [See also *H.A.*, 22: 4288.]

2199. LAURIOL, F.

**La protection des agrumes contre les moisissures à *Penicillium*. (The protection of citrus against penicillium moulds.)**

*Fruits d'Outre Mer*, 1952, 7: 465-75, bibl. 15, illus.

Some aspects of the control of penicillium moulds on citrus were discussed in a previous article [see *H.A.*, 22: 2975] and further study now makes possible more precise recommendations for control. These are great care in harvesting, dipping in 10% borate (which confers immunity for 12 days), coating with wax emulsion and, possibly, covering with diphenyl or plain paper wrappers. These measures should always be put into practice when citrus fruits are to be kept in cold storage for long periods.

2200. NATARAJAN, C. P., AND MACKINNEY, G.

**Carotenoid pigments of orange juice.**

*J. sci. industr. Res., India*, 1952, 11B: 416-18, bibl. 4.

The carotenoid pigments of Valencia orange (California) juice have been examined. In addition to identifying phytofluene,  $\alpha$ ,  $\beta$  and  $\zeta$  carotenes, and pigments with absorption maxima similar to lutein epoxide and flavoxanthin, a new pigment intermediate between phytofluene and  $\zeta$ -carotene has been reported. [Authors' synopsis.]—Univ. Calif., Berkeley.

**Dates.**

(See also 2216j.)

2201. RICHARDSON, A. M.

**The Rayford Park date grove.**

*Qd agric. J.*, 1952, 75: 253-62, illus.

Seedlings of Deglet Noor, Zahidi, Barhee, Thoory, Halaway and Macktoom date varieties were planted at Rayford Park, near Miles, Qd, in 1938. Regular cultivation, irrigation and frost protection was provided during the first 2 years after planting, resulting in hardy, well-established trees successfully withstanding 2 years'



wartime neglect. Notes are given on flowering and fruiting, varietal characteristics and suitability for Queensland conditions, pests and diseases and artificial ripening and curing.

2202. TURMEL, J. M.

L'eau et le sol dans les divers milieux du Sahara occidental et les possibilités agricoles dans les palmeraies. (Rapport préliminaire.) (Water and soil in the western Sahara and the agricultural possibilities of the palm groves.)

*Rev. int. Bot. appl.*, 1952, 32: 482-7.

A description is given of studies made on water movement in the soil in palm groves and in areas undisturbed by man in various parts of the Western Sahara. The investigations showed that the workable soils of the palm areas are mixtures of sand and finer material varying in texture from silt to clay and indicated why these soils hold irrigation water and can carry crops not naturally adapted to the Saharan climate.

*Olives.*

(See also 1492, 1513, 2216n, p, q, t.)

2203. BALDINI, E., AND SCARAMUZZI, F.

Sul valore dei dati biometrici nella descrizione e classificazione delle razze di olivo in coltura. Ricerche sulle razze coltivate in provincia di Firenze. (On the value of biometric data in the description and classification of the cultivated varieties of olive. Studies of the varieties cultivated in Florence province.) [English summary 10 lines.]

*Ann. Sper. agrar.*, 1952, 6: 1597-1636, bibl. 70, illus.

Three years' study of the leaves, drupes and stones of 15 olive varieties showed that in Florence Province biometric data are not an accurate means of identification.—Arboricultural Institute, Florence University.

2204. RENAUD, M.

Évolution de la technique culturale de l'olivier. (A new technique in olive-growing.)

*Fruits et Prim.*, 1952, 22: 299-303, illus.

Comparison is made between 2 plantations in Tunisia, one of them established by new (Boglio) methods of soil treatment, planting and training and the other by the classical technique, on a coarse, rather shallow, somewhat infertile tuff soil under an average annual rainfall of 300-400 mm. (minimum 250 mm.). In both cases large rooted cuttings taken from near the base of seedling plants were planted at 12 × 12 m. (69/ha.). The chief differences between the 2 methods (classical technique in brackets) are prolonged working of the soil beforehand with deep ploughing to ensure maximum water retention and weed destruction (no preparatory work beforehand), planting in small holes (large holes), green manuring in early years (regular cultivation), encouragement of leafy bushy habit by suppression of main stems for some years, then establishment of 3-4 framework branches (establishment of framework from the start and light but frequent removal of ill-placed shoots). The total yield per tree to date in 1951 was 124 kg. under the new technique after only 7 harvests and 83 in the classical after 15 harvests.

2205. BUZI, C. C.

Olivicoltura speciale. (Specialized olive growing.)

*Humus*, 1952, 8 (5): 10-12, illus.

After unsuccessful experiments in dwarfing by grafting on other oleaceous species, such as privet, potting experiments began in 1938. One-year-old plants of 1 oil and 2 dessert varieties were put in pots of 13 l. capacity (ht. and max. diam. 29 cm.). On potting the branches were cut back to 15 cm. and then left to grow for a year. Framework formation then began, some multiple and others simple pyramids. In 1942 the pots were replaced by others of 28 l. capacity (ht. and max. diam. 36.5 cm.). In early 1945 the dimensions of the plants were: root system (size of pot) 28 l., stem ht. 28 cm., stem diam. 25 mm., width and ht. of crown in multiple pyramid shape 80 and 100 cm. respectively, and in simple pyramid shape 50 and 110. Seven years later the plants were almost the same size but with thicker stems and continued to display all the characteristics of habit, leaf and fruit normal to their variety. Fruiting had begun 2 years after potting. In the 1951-52 season the plants fruited abundantly, and then flowered profusely in the following May. In the 14th year of potting this system of dwarfing can be regarded as entirely successful. Dwarfed plants could be used for propaganda display to stimulate demand for olives and oil in non-producing countries, for commercial growing in the open and under glass, and for ornamental purposes.

2206. FEDERICI, E.

La trasformazione degli olivastreti. (The transformation of the wild olive scrub [in the Civitavecchia district, Italy].)

*Ital. agric.*, 1952, 89: 817-22, illus.

The transformation of the wild olive scrub near Civitavecchia [north-west of Rome] into cultivated groves is discussed. Farmers could combine olive-growing with sheep-rearing and, where possible, the cultivation of cereals. Experiments show that the best method of topworking old trees is by budding or grafting on branches cut back to within a few cm. of the main trunk.

2207. NORO, K., AND INOUE, T.

Morphological studies of olive tree. I. (1) On the differentiation of the flower-bud and development of the floral organ.

*Tech. Bull. Kagawa agric. Coll.*, 1952, 3: 135-9, bibl. 10, illus.

In studies on the Mission variety of the olive the date of initiation of the flower bud was taken as that on which sepal primordia were first observable and the date of initiation of the inflorescence as that on which the terminal bud differentiated into 3 flower buds. The 2 events both occurred on 25 April in 1951, full bloom following on 3 June. In 1950 the dates of flower initiation and full bloom were 17 April and 28 May respectively.

2208. BOUAT, A., RENAUD, P., AND DULAC, J.

Étude sur la physiologie de la nutrition de l'olivier. (Premier mémoire.) (The physiology of olive nutrition. First communication.)

*Ann. agron. Sér. A*, 1951, 2: 828-48, bibl. 14, illus. [received 1953].

The first half of the paper is devoted to various aspects of olive growing in France and the second half to the problem of leaf sampling for foliar diagnosis. Analyses showed that leaves may be taken at random from the middle portion of shoots in any part of the crown, provided the shoots are of the same year and the leaves of a similar age.

## 2209. SCARAMUZZI, G.

Su un secume dei rametti d'olivo. (A desiccation of olive branches.)

*Humus*, 1952, 8 (4): 16-18, bibl. 1, illus.

The condition was observed in 25- to 30-year-old Taggiasca trees in 2 Ligurian plantations. External symptoms are desiccation of the leaves and branches of the outer crown, a characteristic feature being the presence of healthy branches among and above unhealthy ones. Desiccation occurs rapidly after the first appearance of outward symptoms and is often complete in 5-6 days. Infected leaves become brown, curl downwards and persist for 15-20 days. Internal symptoms are necrosis of bark and wood, the vessels becoming filled with dark substances. Microscopic examination has not revealed the presence of bacteria or fungi. Attempts to isolate bacteria or fungi and to infect healthy plants gave negative results. The symptoms somewhat resemble those of a disease previously reported in olives in Sicily in which *Verticillium albo-atrum* may be involved [see *H.A.*, 17: 683 and 19: 245].

## 2210. CABRAL, R. V. DE G.

Notas sobre o "Gloeosporium olivarum" Alm. III. Ensaios de tratamento. IV. Influência dos ataques do *G. olivarum* Alm., do *Fusarium* sp. e do *Dacus oleae* Gmel. no rendimento e qualidade do azeite. (Notes on *Gloeosporium olivarum*. III. Experiments in treatment. IV. Influence of *G. olivarum*, *Fusarium* sp., and *Dacus oleae* on yield and quality of the oil.) [French summaries.]

*Bot. Jta nac. Azeite*, 1949, Vol. 4, No. 15, pp. 16 and No. 16, pp. 16, from abstr. in *Rev. appl. Mycol.*, 1952, 31: 500.

In two series of tests preventive spraying of olive trees with 1% bordeaux plus wetter at the inception of ripening considerably reduced infection by *Gloeosporium olivarum* and *Fusarium* [?microphlyctis]. Once infection became established, however, it was no longer possible to achieve a cure. In affected fruits the oleic acid content rose by 6.7-18.7 g. per 100 olives, according to severity of infection. The reduction in oil yield due to *G. olivarum* was computed at 19.2%. The experiments were carried out in 1941 at the National Agronomic Station, Sacavem, Portugal.

*Passion fruit.*

(See also 2216r.)

## 2211. WILLIAMS, E. P.

Passion fruit species.

*Qd Fruit Veg. News*, reprinted in *Fruit and Prod.*, 1952, 7 (7): 31-2.

Brief descriptions are given of the purple passion fruit (*Passiflora edulis*), the golden passion fruit (*P. edulis* f. *flavicarpa*), the granadilla (*P. quadrangularis*), the bell apple (*P. laurifolia*), the sweet granadilla (*P. ligularis*),

the sweet calabash (*P. maliformis*), the decorative *P. aurantia*, and the banana passion fruit (*Tacsonia mollissima*).

*Tung.*

(See also 2216w.)

## 2212. PLANCK, R. W., PACK, F. C., AND SKAU, D. B.

Abstract bibliography of the chemistry and technology of tung products, 1875-1950.

[*Mimeo. Publ.*] U.S. Dep. Agric. A.I.C.-317, 1952, in 4 vols., pp. 811, bibl. over 2,800.

This monumental compilation contains over 2,800 references to articles and patents, mostly with abstracts, relating to the culture of the tung tree, *Aleurites fordii* and *A. montana*, and to the chemistry and technology of the tung fruit and of the oil and meal derived from the fruit. The references are grouped by subjects, being arranged alphabetically by authors within each group. Author and patent indexes and a detailed subject index are provided. It is interesting to observe that the literature on the oil and other products and their uses is about four times as numerous as that devoted to the trees and their culture. Nevertheless this will be a most valuable work of reference to anyone concerned with research on any aspects of tung growing.

## 2213. CHAVANCY, A.

L'abrasin en Indochine. (*Aleurites montana* in Indo-China.)

*Agron. trop.*, 1952, 7: 455-86, 567-88, bibl. 2½ pp., illus.

This paper is a review of work on *Aleurites montana* in Indo-China and elsewhere. It contains chapters on the systematics, morphology (in detail), breeding and cultivation of the species, and a supplement on production in parts of the world other than Indo-China. In describing planting methods and cultural techniques—some of them new and experimental—used in Indo-China, the author expresses his opinion that the establishment of large industrial plantations in that territory is not at present an economic proposition. The planting of basket plants or plants with a ball of earth round their roots is preferable to the planting of plants with bare roots, or stumps, or to direct sowing. Planting is either at 6×6 m., or at 9×3.5 m.; in the latter case alternate plants are eliminated in the 7th year to give a spacing of 9×7 m. (150/ha.). Planting holes 60×60 cm. are dug a month before planting, each receiving 30 g. of farmyard manure and 2 g. tricalcium phosphate. The trees require a light-demanding cover crop up to the age of 7 and, it is believed, a shade-tolerant one thereafter. The first two of the following five cover crops tried at the young stage gave the best results: *Tithonia diversifolia*, *Cajanus indica*, *Calopogonium mucunoides*, *Tephrosia vogelii* and *T. maxima*. Manurial experiments are described. Average yields varied from 100 to 400 kg. of oil per ha.; 720 kg. was a good yield. A list is given of mite, nematode, insect, fungal and bacterial parasites.

## 2214. CUTTING, C. V.

The requirements for efficient expression of tung oil: relationship to harvesting conditions.

*J. Sci. Food Agric.*, 1952, 3: 505-10, bibl. 4.

Experience has shown that a low moisture content in



the seed is essential for satisfactory expression of the oil. The greater size of tung seed compared with other oil seeds led to experiments with both whole seeds and disintegrated meal, but similar conclusions were reached with both types of seed. Determination of the equilibrium moisture contents of tung seed under the usual atmospheric conditions of Nyasaland showed that the accepted estate methods of harvesting could be improved, resulting in higher yields of oil being expressed from the seed. [Author's abstract.]-Tung exp. Stat., Nyasaland.

### Other crops.

(See also 2216b.)

2215. KHAN, K. F., AND KRISHNASWAMY, A. R.  
A note on the propagation of the tree tomato (*Cyphomandra betacea* Sendt.) by stem cuttings.  
*Ind. J. Hort.*, 1952, 9 (3): 49.

The rooting of hardwood cuttings of the tree tomato was 72% and 62% successful if the cuttings were planted in November and December respectively.—Pomological Station, Coonoor.

### Noted.

- 2216.
- a CHAPMAN, H. D., LAURANCE, B. M., AND BINGHAM, F. T.  
Salinity changes in irrigated soils.  
*Calif. Citogr.*, 1952, 38: 46, 58, bibl. 3.  
Long-term experiments on Californian citrus soils.
  - b CHEVALIER, A.  
Les jujubiers ou *Ziziphus* du Sahara. (The jujubes or *Ziziphus* of the Sahara.)  
*Rev. int. Bot. appl.*, 1952, 32: 574-7.  
*Z. nummularia*, *Z. spina-christi*, *Z. mauritiana* and *Z. lotus*.
  - c DEAN, H. A.  
Some beneficial insects of citrus in the Lower Rio Grande Valley of Texas.  
*Proc. 7th Annu. Rio Grande Valley hort. Inst.*, 1953, pp. 42-7, bibl. 5.
  - d EMBLETON, T. W., KIRKPATRICK, J. D., AND PARKER, E. R.  
Phosphatic fertilizers on Valencias.  
*Calif. Agric.*, 1952, 6 (11): 8-9, illus.  
For another account, see *H.A.*, 23: 1139.
  - e ERICKSON, L. C.  
Washington Navel fruit drop.  
*Calif. Agric.*, 1952, 6 (11): 7, 15.  
For another account, see *H.A.*, 22: 2959.
  - f ERICKSON, L. C.  
Lemon storage.  
*Calif. Agric.*, 1952, 6 (12): 4, illus.  
For another account, see *H.A.*, 22: 4287.
  - g GALLO, D.  
Coccideos dos citrus. (Citrus scale insects.)  
*Rev. Agric. Piracicaba*, 1952, 27: 293-300, bibl. 6.
  - h GODFREY, G. H.  
Avoiding some hazards in banking trees.  
*Proc. 7th Annu. Rio Grande Valley hort. Inst.*, 1953, pp. 33-4.  
Where earthing up is done for frost protection.
  - i GURGEL, J. T. A., AND SOUBIHE SOBRINHO, J.  
Poliembrionia em mirtáceas frutíferas. (Polyembryony in the fruit-bearing Myrtaceae.) [English summary  $\frac{3}{4}$  p.]  
*Bragantia*, 1951, 11: 141-63, bibl. 14, illus. [received 1953].
  - j HATWALNE, B. V., AND SOHONIE, K.  
Thiamine, riboflavin, nicotinic acid and vitamin C contents of palm gur.  
*Curr. Sci.*, 1952, 21: 349, bibl. 10.  
Contents tabulated for date and palmyrah gur.
  - k JANSEN, E. F., AND JANG, R.  
Cysteine and glutathione in orange juice.  
*Arch. Biochem. Biophys.*, 1952, 40: 358-63, bibl. 12.
  - l KAPCINELJ, M. A.  
Prospects of developing citrus cultivation. [Russian.]  
*Sad i Ogorod*, 1952, No. 11, pp. 37-41, illus.  
Under the new 5-year plan.
  - m MILLER, J. M., AND ROCKLAND, L. B.  
Determination of cysteine and glutathione in citrus juices by filter paper chromatography.  
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A brief review of citrus growing in West Africa. [See also *H.A.*, 20: 1907.]
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*Tech. Bull. Kagawa agric. Coll.*, 1952, 3: 140-57, bibl. 105.  
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Olive culture on Western Province fruit farms.  
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Embryology of the *Passifloraceae*.  
*Curr. Sci.*, 1952, 21: 288-9, bibl. 1, illus.  
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- s** REBOUR, H.  
La fumure des arbres fruitiers. État de la question en Algérie. (Manuring of fruit trees. The situation in Algeria.)  
*Rev. hort. Paris*, 1953, **125**: 802-3, bibl. 5, illus.  
Mainly of citrus.
- t** SARASOLA, A. A.  
Nueva enfermedad del olivo en la Argentina causada por "*Cercospora cladosporioides*" Sacc. (A new disease of the olive tree in Argentina caused by *Cercospora cladosporioides*.)  
*Rev. Fac. Agron. La Plata*, 1951, **28**: 41-7, bibl. 6, illus.  
See *H.A.*, 23: 1212.
- u** SINCLAIR, W. B., AND LINDGREN, D. L.  
Effect of load in fumatorium on sorption of fumigants.  
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With reference to citrus.
- v** WAIBEL, C.  
Varieties and strains of citrus originating in the Lower Rio Grande Valley of Texas.  
*Proc. 7th Annu. Rio Grande Valley hort. Inst.*, 1953, pp. 18-24, bibl. 6.
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Bibliography of the fungi and bacteria associated with tung (*Aleurites* spp.).  
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Listed by organisms and countries.

## TROPICAL FRUIT AND PLANTATION CROPS.

*General.*

(See also 1433, 2370, 2372, 2378, 2382, 2390, 2399.)

2217. PLUMBE, W. J.  
The bibliographical basis of agricultural research with special reference to the tropics.  
*Trop. Agriculture Trin.*, 1952, **29**: 15-27.

This paper gives an outline of the bibliographical material that is available on tropical agriculture and is designed to help the worker who is new to this field or unfamiliar with recent literature. Notes are given on important bibliographical reference books and periodicals on agriculture in general, and on the following ancillary subjects: botany, entomology, crops (cotton, cereals, sugar, tobacco, miscellaneous), plant nutrition, and soils and chemistry.

2218. COMMONWEALTH ECONOMIC COMMITTEE.  
Plantation crops.  
[*Publ.*] *Commonw. econ. Cttee*, 1952, pp. 120, H.M. Stationery Office, 5s.

This third post-war issue of *Plantation Crops* consists of a summary of figures of production, trade and consumption relating to sugar, tea, coffee, cocoa, spices, tobacco and rubber over the period 1937 to 1951 inclusive. The ground covered and the arrangement of information is similar to that in the 1950 edition [see *H.A.*, 21: 2149].

2219. SOUTH PACIFIC COMMISSION.  
Current research in the South Pacific in the field of economic development.  
*Tech. Pap. S. Pacific Commiss.* **29**, 1952, pp. 82, 2s.

Notes are given on research work in progress in the South Pacific Territories on economic crops, pasture and fodder grasses, livestock, plant pests and diseases, general farming practice, land use, forests, fisheries, and miscellaneous projects including geological surveys. Among the economic crops dealt with are coconuts in Fiji, French Oceania and Papua-New Guinea, rubber in Papua-New Guinea, fruit (papaw, banana and citrus) in American Samoa, Fiji, New Caledonia, Niue and Western Samoa, cacao in the Solomon Islands, Fiji, Papua-New Guinea and Western Samoa, coffee and tea in Papua-New Guinea, sugar cane in Fiji,

fibres in Papua-New Guinea, and drug plants (notably cinchona) in French Oceania, New Caledonia, and Papua-New Guinea. Work on diseases and pests is mainly concentrated in the Solomon Islands, Fiji, New Caledonia and Papua-New Guinea.

2220. SAHARANPUR.  
A research station is established.  
[*Publ.*] *hort. Res. Stat. Saharanpur, U.P.*, 1952, pp. 14, illus.

It was decided in 1949 to revive the Saharanpur Gardens, probably the oldest botanical gardens in Asia, and to establish a horticultural station there. This brochure presents a popular account of work that has been started and plans for the future. Among the crops being studied are mangoes, litchis, jack fruit, ber, citrus, custard apples, loquats, papaws and cabbages. Pomology, physiology, fruit breeding, chemistry, entomology and plant pathology are among the sections mentioned. A seed and plant exchange service has been started.

2221. LÉVI-STRAUSS, C.  
The use of wild plants in tropical South America.  
Reprinted from *Smithsonian Inst., Bur. Amer. Eth. Handb. S. Amer. Ind.*, 1950, **6**: 465-86, in *Econ. Bot.*, 1952, **6**: 253-70, bibl. 80.

There are many intermediate stages between the utilization of plants in their wild state and their true cultivation. Palms are perhaps the most important semi-cultivated plants, about 20 genera being widely used providing among other things fruit, wine, oil, vegetables and fibres. Notes are also given on other plant species providing the natives with rubber, gums and resins, pigments and dyes, drinks, condiments, poisons, medicines and nuts and fruits.

2222. U.P. DEPARTMENT OF AGRICULTURE, BUREAU OF AGRICULTURAL INFORMATION.  
Propagation of fruit plants.  
*Agric. Anim. Husb. U.P.*, 1950, **1** (3): 19-27 plus plates 12 pp. [received Dec. 1952].

Following a general account of methods of propagation by seed and vegetative means advice is given on the propagation of the following fruits: mango, citrus



fruits, banana, grape, fig, pomegranate, loquat, guava, litchi, papaw, pineapple, ber (*Ziziphus jujuba*), falsa (*Grewia asiatica*), karonda (*Carissa carandas*), bel (*Aegle marmelos*), custard apple (*Annona squamosa*), aonla (*Phyllanthus emblica*), mulberry, sapodilla, carambola and jamun (*Eugenia jambolana*). Reference is made to the use of seedlings of *Bassia longifolia*, *B. latifolia* and *Mimusops hexandra* as well as *Achras sapota* as rootstocks for sapodilla. [Special attention is drawn to the numerous clear line drawings which accompany the article.]

2223. TIDEMAN, P.

Mechanisatie in de bergcultures. 4. (Mechanization of highland plantation crops. 4.)

*Bergcultures*, 1952, 21: 405-13, bibl. 7.

The possibilities of mechanization in Java and Sumatra are discussed under the following headings: (1) Land development and reclamation; (2) Laying out and upkeep of plantations; (3) Laying out and upkeep of roads and railways; (4) Transport; and (5) Control of pests and diseases. [For earlier articles in this series, see H.A., 22: 933 and 1857.]

2224. TOXOPEUS, H. J.

A thornless variety of *Mimosa invisa*.

[French and Dutch summaries  $\frac{1}{2}$  p. each.]

*Euphytica*, 1952, 1: 130-2.

The more general use of *Mimosa invisa*, one of the best annual cover crops for the tropics, is limited by its thorns, which make the crop difficult to handle. In 1942 a thornless plant was found in Java, and this is now cultivated over a large area of one estate. The thornless plants breed true and it is thought that the original plant was a mutant. The variety is expected to be of major importance for land reclamation in the tropics.

2225. AP GRIFFITH, G.

The interception of rain water by a vegetable mulch.

*Trop. Agriculture Trin.*, 1952, 29: 50-3.

In experiments in Trinidad various mulches ranging from 1 to 7 inches thick were used. There was little difference between the percentage retention of the various thicknesses. In the case of a 6-in. elephant grass mulch a daily rainfall of less than 0.1 in. did not penetrate; of a daily rainfall of less than 0.25 in. over 75% was often intercepted; and even when the rainfall was up to 0.6 in. in a day over 50% failed to reach the soil. A mulch might therefore have the effect of drying the soil, possibly more often in periods or localities with lower or less intense rainfall. Results suggested that most of the evaporation took place from the top inch.

2226. LAL, K. B.

Insect pests of fruit trees grown in the plains of the Uttar Pradesh and their control.

*Agric. Anim. Husb. U.P.*, 1950, 1 (3): 46-57, and 1 (4): 30-45, plus plates 12 pp. [received Dec. 1952].

An account is given of the following insect pests, their life histories and recommended control measures: (1) Mango: mango mealy bug (*Drosicha stebingi*), mango hoppers (*Idiocerus clypealis* and *I. atkinsoni*), leaf cutting weevil (*Eugnamptus* sp.), mango stem borer (*Batocera rufomaculata*), bark eating caterpillar (*Inderbela quadrinotata*), red ant (*Oecophylla smaragdine*), fruit flies (*Strumeta ferrugineus* and *S. zonatus*), mango

scale insects (*Pulvinaria polygonata*, *Parlatoria pergandei* and *Lepidosaphes gloveri*), mango shoot gall maker (*Apyssila cistellata*), mango leaf gall maker (*Procontarinia matteiana*, etc.), and termites. (2) Citrus: lemon butterfly (*Papilio demoleus*), citrus leaf miner (*Phyllocnistis citrella*), citrus white flies (*Aleurocanthus spiniferus* and *A. woglumi*), fruit sucking moths (*Otheiris fullonica*, *O. materna*, *Achaea janata*, and *Calpe emarginata*) and citrus psylla (*Diaphorina citri*). (3) Pomegranate: anar butterfly (*Virachola isocrates*). (4) Ber or jujube: ber fruit fly (*Carpomyia vesuviana*). (5) Singhara (*Trapa bispinosa*): singhara beetle (*Galerucella birmanica*). (6) Melon: red pumpkin beetle (*Aulacophora foveicollis*). (7) Other fruits mentioned are guava, loquat, plum, litchi, jack fruit, fig, karaunda, banana, aonla (*Phyllanthus emblica*) and sapota (sapodilla). Details are given of the preparation of various insecticides recommended for use against these pests. The insects themselves are illustrated.

2227. G[ONZÁLEZ] M[ENDOZA], R.

Control de la hormiga "arriera". Comprobación de la toxicidad de chlordano 74% emulsionable. (Control of *Atta* ants. Testing the toxicity of 74% emulsifiable chlordane.)

*Bol. inf. Colombia*, 1952, 3 (32): 36-7.

In experiments conducted by the National Coffee Research Centre, Chinchina, Colombia, 3 *Atta* ant-nests (2 medium-sized and one large one) were isolated by trenches 1.2 m. deep which were coated with oil mixed with insecticide to prevent the escape of the ants. 74% emulsifiable chlordane as a 0.1% aqueous dilution was applied to the nests through holes punched with a crowbar. The treatment was 100% effective in each case and the fact that the trenches contained no ants killed or imprisoned by the mixture showed that the insects had made no attempt to escape. Important factors in the treatment are: (1) careful location of the nest; (2) covering its whole surface with holes 20-25 cm. apart; (3) preparation of the insecticide at the time of application.

2228. RAMA RAO, P. B., BALAKRISHNAN, S., AND RAJAGOPALAN, R.

Influence of freezing on the volume of juice extracted and ascorbic acid content of certain fruits.

*Curr. Sci.*, 1952, 21: 337-8, bibl. 4.

Mango, cashew apple, amla [*Emblica* sp.], lemon and orange fruits kept at -20° F. for 48 hrs yielded substantially more juice with a higher ascorbic acid content than fruits kept at room temperatures.

Bananas.

(See also 2367c, f, 2368a.)

2229. SIMMONDS, N. W.

The germination of banana seeds.

*Trop. Agriculture Trin.*, 1952, 29: 35-49.

Experiments on factors affecting the germination of banana seeds are described. Seeds should be extracted from mature, ripe fruits; they should be well cleaned and stored, if necessary, in a desiccator, though viability may be retained for about six months simply by drying in the sun. In the greenhouse free drainage is very important. Pre-sowing treatments such as

soaking in sulphuric acid, chipping of the testa, soaking in water, scorching, and the application of temperature shocks are usually deleterious and often lethal. Results are discussed in relation to the needs of experimental technique and of a banana collecting expedition. [Author's summary.]

2230. EADY, C.

**Contour planting of bananas.**

*Agric. Gaz. N.S.W.*, 1952, 63: 485-9, 531-3, illus.

The advantages of contour planting are discussed, the method of surveying the land correctly is set out, and the necessary tools described. Contour planting, together with sound cultural practice, should extend the life of a plantation to 15 or 20 years or even longer.

2231. STOVER, R. H., THORNTON, N. C., AND DUNLAP, V. C.

**Changes in the soil flora of banana lands flood fallowed for the eradication of *Fusarium oxysporum cubense*.**

From abstr. in *Phytopathology*, 1952, 42: 476.

Flood fallowing was introduced to eradicate *Fusarium oxysporum cubense* from infected land, clay loam soils being submerged for up to 6 months under 2 to 4 feet of water. The greatest decrease in the fungus flora occurs about the thirty-fifth day of submergence, and after 120 days most of the indigenous fungus flora is eradicated. After flooding, however, soils are more favourable to growth of *F. oxysporum cubense* than non-flooded soils; growth is optimum in all soils at a moisture content of 25% of the field capacity.

2232. DE TOLEDO, A. A.

Notas preliminares sobre o controle da broca do rizoma da bananeira (*Cosmopolites sordidus*) Germ. (Preliminary notes on the control of the banana borer, *Cosmopolites sordidus*.)

*Biológico*, 1952, 18: 145-52, bibl. 3, illus.

Notes are given on experiments conducted in 1950-52. *Preventive experiments.* Eight 5-plant randomized blocks of 4-month-old suckers at 4×4 m. were employed. Before planting, the suckers were disinfected by peeling in a manner described. Periodical soil applications were made of 3 dusts, viz. 3% BHC, 5% chlordane and 20% chlorinated camphene. The rates of attack under monthly applications were: BHC nil %, chlordane and chlorinated camphene 20% each; and under bi-monthly applications: BHC nil %, chlordane 40% and chlorinated camphene 60%. During the vegetative period the insecticides had no observable ill effects on the plants, but the yield of the BHC blocks was seriously reduced by Panama disease which killed 3 of the plants. The total weights of bananas for the 10 plants receiving each treatment were: chlordane 66.6 kg., chlorinated camphene 65.1 kg., control 58.8 kg., and BHC 33.5 kg. *Bait experiments.* Rhizomes formed better baits than the epigeal parts, the best rhizomes being large ones opened longitudinally or transversely and placed in the ground with a part showing. Collections of the insects in the baits were made every 3 days for the 50-day lethal period and the total numbers obtained from the 2 roots under each treatment were: BHC 313, control 222, and chlordane 207.

2233. DEULLIN, R.

La possibilité de mieux connaître le degré d'évolution de la banane à la coupe. (Means of determining the stage of development of bananas at harvesting.)

*Fruits d'Outre Mer*, 1952, 7: 529-33.

The arrival of bananas on the market in good condition depends upon the accurate estimation of their stage of development at harvesting, which at present is made empirically. Experiments with an Ulrich penetrometer on the Ivory Coast in 1952 suggest that the hardness of the pulp may provide accurate information regarding the rate and stage of development of the fruit.—I.F.A.C.

2234. MARCELLI, E.

Un'alterazione delle banane provenienti dalla Somalia causata dal *Gloeosporium musarum* Cooke et Massee. (A disease of bananas from Italian Somaliland caused by *Gloeosporium musarum*.) [English summary 3 lines.]

*Not. Mal. Piante*, 1952, No. 20, pp. 22-6, bibl. 10.

Notes are given on the conditions predisposing bananas to outbreaks of this disease. Control measures suggested are: (1) Cutting the fruit at the right degree of ripeness and covering the cuts with sulphur paste, (2) avoiding injury to the fruit during transport, and (3) reducing as much as possible the period between harvesting the fruit and placing it in cool storage.

**Cacao.**

(See also 2387, 2394.)

2235. ADDISON, G., AND TAVARES, R.

**Hybridization and grafting in species of *Theobroma* which occur in Amazonia.**

*Evolution*, 1952, 6: 380-6, bibl. 4.

Among 9 species of *Theobroma* combinations which produced hybrid progeny, or at least hybrid seeds, were also usually successfully grafted on to each other. Where hybridization failed, so, too, did interspecific grafting. From the data obtained in these experiments it is proposed that the species be divided into 4 groups as follows: I. *T. subincanum*, *grandiflorum*, *obovatum*; II. *T. cacao*, *microcarpum*; III. *T. speciosum*, *spruceanum*, *bicolor*; IV. *T. mariae*. This classification agrees with, or at least is not contradicted by, the morphology of the species concerned.—Instituto Agronomico do Norte, Belém do Pará, Brazil.

2236. RUSSELL, T. A.

**The vigour of some cacao hybrids.**

*Trop. Agriculture Trin.*, 1952, 29: 102-6, bibl. 7.

In a replicated yield trial established near Ibadan, Nigeria, in 1942 the selfed progeny of a Nigerian cacao of the Trinitario type were compared with selfed seedlings of a Trinitario from Trinidad and with hybrids of the 2 types. The hybrids showed marked superiority in early vigour. In 1948 the mean girth per tree at 3 in. above ground of 3 groups of each of the 3 types were: Trinidad—7.7, 8.3, 9.2; Nigerian—9.2, 8.2, 9.2; Nigerian×Trinidad—10.9, 10.3 and 10.7. The hybrids also gave a markedly superior early yield, due to the larger number of pods produced rather than



to the greater bean size. The weight of wet beans per acre produced by 3 groups of each of the 3 types in the first 5 years of fruiting were: Trinidad—466, 1,237 and 932 lb.; Nigerian—790, 756 and 364; Nigerian×Trinidad—3,751, 2,573 and 2,675.

2237. (CASTRO, H.)

Factors affecting the rooting of cacao cuttings.\*

*Cacao*, 1952, 2 (34/36): 1.

"Hormodin No. 2" gave results consistently inferior to alcoholic solutions of indolebutyric acid in concentrations from 2,000 to 10,000 p.p.m. The best results were obtained with IBA at 8,000 p.p.m. in 60% alcohol applied by the quick-dip method; cuttings thus treated produced 100% more roots than those treated with the commercial product and the average root length was 5-10 times greater, but the difference in percentage of cuttings rooted was not significant. The best rooting was obtained with cuttings in full flush (the flush being removed before placing the cuttings in the propagator), but this superiority was dependent on IBA since cuttings in flush gave the poorest results when not treated with hormones. A description is given of a simple propagator covered with cloth moistened continuously by capillarity, in which it was possible to maintain nearly 100% humidity without watering more often than once in every 3 days.

2238. EDEN, D. R. A., AND EDWARDS, W. L.  
Cocoa plantation management in Western Samoa.

*Tech. Pap. S. Pacific Commiss.* 31, 1952, pp. 20, illus., 2s.

A description is given of management practices and processing technique in the New Zealand Reparation Estates cocoa plantations, Central Group, which are situated near Apia on Upolu Island and consist of about 1,500 acres of hybridized Criollo/Forastero at a spacing of 16×16 feet. Beans for processing are placed in fermenting boxes (5×4×3 ft.) built in a long fermentary with 20 boxes a side and after 5½ days, during which they are regularly turned, are transferred to a washer which consists of a revolving steel drum with a wooden-slatted circumference set in a tank and holding 3,000 lb. beans. Three changes of water complete the washing and the beans are then spread on the floor of a "Martin" hot air drier (illustrated and fully described) in which the products of combustion circulate through a flue to a smoke stack in a closed space so that the surrounding air is heated, rises and passes through a wooden grate upon which the wet beans are spread. When dry, the beans go through the McKinnon rotary drier or finishing drum in which they are cured by hot air. Other questions discussed are grading, under-sized and broken beans, and shrinkage.

2239. THOROLD, C. A.

Airborne dispersal of *Phytophthora palmivora*, causing black-pod disease of *Theobroma cacao*.

*Nature*, 1952, 170: 718-19, bibl. 9.

The statistical analysis of observations in Nigeria has shown that *Phytophthora palmivora* sporangia may be airborne and that the horizontal dispersion of the

black-pod disease of cacao is possible in "dry air". Detailed results of black-pod studies will be published elsewhere. [See also *H.A.*, 22: 4325.]

2240. McLAUGHLIN, J. H.

Fungicidal control of *Phytophthora palmivora* Butl. on *Theobroma cacao* L. in Costa Rica.

*Cacao*, 1952, 2 (25/27): 1-2.

This is a summary of a paper read at the XII International Congress of Pure and Applied Chemistry, New York, 1951. Points from the summary are as follows. In Costa Rica *Phytophthora palmivora* attacks many parts of the plant in addition to the pods and is a general debilitating agent. Control by the use of resistant clones cannot yet be evaluated on large field plantings, and cultural and sanitary practices have not been effective in Costa Rica. In unreplicated experiments plots sprayed with 1.25% bordeaux mixture on a 30-day and on a 60-day cycle showed nearly 100% and 65% increase in production respectively over the control during a 5-year period. Other tests begun in 1950 show that the effects of the fungus are controlled by bordeaux, and that SR-406 and Dithane Z-78 are ineffective on 30-day cycles (probably owing to lack of adhesive qualities).

2241. SILLER, L.

The efficacy of fungicides against *Phytophthora palmivora* Butl.

*Comun. Turrialba*, No. 17, from abstr. in *Cacao*, 1952, 2 (34/36): 2.

Fourteen new fungicides were tested on cacao seedlings at La Lola Farm, Costa Rica, in 1949-50 under various climatic conditions. They were applied at a concentration of 0.50% in water, except for bordeaux mixture which was used at 1.0% and 1.2%. The percentages of plants diseased after 5-9 and 26-9 days respectively following the application of some of the more effective fungicides were: Bordeaux—6 and 36; Crag 531—11 and 45; Crag 658—13 and 57; Bioquin—18 and 55; Phygon—18 and 68; Orthocide 406—19 and 90; Yellow Cuprocide—29 and 53; control—90 and 100. Other fungicides tried were tribasic copper sulphate, Copper A, Dithane Z-78, Puratized Agricultural Spray, Fermate, Karbam black, Crag 341-C and Zerlate. It is concluded that several of the new fungicides have possibilities in so far as toxicity is concerned, but that some means of increasing their adhesiveness is necessary.

2242. FIGUEROA POTES, A.

*Monalonia* sp., plaga importante en el cacao del Valle del Cauca—Colombia.

(*Monalonia* sp., an important pest of cacao in the Cauca valley, Colombia.)

*Acta Agron. Palmira*, 1952, 2: 183-93, bibl. 6, illus.

*Monalonia* sp., whose morphology is described, was first observed in the Cauca valley in a restricted area (40 ha.) in 1952. The eggs are laid in the skin of the pods. The nymphs and adults, which were present in abundance, suck the sap of fruits of all sizes and of tender shoots and young leaves.

2243. (MOOJEN, J.)

Rats as pests of cacao in Bahia.

*Cacao*, 1952, 2 (34/36): 3.

\* Résumé of a thesis entitled "Algunos estudios sobre el arraigamiento de estacas de cacao".

The arboreal rat, *Rhipidomys maculipes* (Cricetidae), has been causing considerable damage in Bahia State, Brazil, by eating cacao beans in the dry season when wild figs, its chief food, are scarce. As the use of poison to eliminate the rats would probably be uneconomical and temporary, the author recommends preventive control by the destruction of *Ficus* trees and of the bromeliad epiphytes in which the pests nest.

2244. WIKRAMANAYAKE, V. E. A.

**Drying of cacao in wet weather.**

*Trop. Agriculturist*, 1952, 108: 49.

A drying floor, overlying a narrow trench through which passes heat from a wood fire, is described briefly. The system is designed primarily for small holdings but can be adapted for large-scale use. Cacao dried on this floor is equal in quality to flue-dried cacao.

*Cloves.*

2245. NUTMAN, F. J., AND ROBERTS, F. M.

**Sudden-death disease of the clove tree,**

*Eugenia aromatica*.

*Nature*, 1953, 171: 128, bibl. 2.

An undescribed *Valsa* sp. was invariably found to be present when clove trees were affected by sudden-death disease. The absorbing roots die at an early stage of the disease, and the fungus can be isolated from the distal point of the root system. It can be found at the collar a week or more after death and afterwards it spreads rapidly throughout the tree. Experiments have shown that *Valsa* can readily invade the tissues of mature clove trees, that young trees are comparatively resistant, and that seedlings are immune. Inoculations in the field of uninjured roots of mature trees led to the absorbing roots being attacked by the fungus, which later invades the fibrous root system, advancing in the cambial region, whence it spreads to other tissues. In plantings previously devastated by sudden-death a progressive decline of 6- to 18-year-old clove saplings was found to be accompanied by a *Valsa* root rot. The authors believe the decline to be a symptom expression of sudden-death in young trees not yet fully susceptible to the fungus. Outbreaks of sudden-death in previously disease-free areas are thought to be due to *Valsa* acting as a wound parasite causing a branch die-back.—Clove Res. Scheme, Zanzibar.

2246. NUTMAN, F. J., AND ROBERTS, F. M.

**Acute die-back of clove trees in the Zanzibar Protectorate.**

*Ann. appl. Biol.*, 1952, 39: 599-608, bibl. 8, illus.

A group of diseases known collectively as die-back of clove trees is widespread in the Zanzibar Protectorate. The form described here, which is caused by *Cryptosporrella eugeniae* sp. nov., is the most widespread and probably causes even greater loss than the sudden-death disease. The most noticeable symptom is the death of a branch or a portion of a branch, or, in young saplings, of the entire tree; in mature trees infection eventually leads to the semi-moribund trees now common in almost every clove plantation. The fungus invariably enters through a wound. The prevalence of *Cryptosporrella* die-back is almost entirely attributable to the destructive methods of harvesting now practised, com-

bined with the presence of much infected material present in the plantations. Suggested control measures are based on the removal of old sources of infection and prevention of future damage, combined with remedial treatment where possible.—Clove Res. Scheme Zanzibar.

*Coconuts.*

(See also 2367r, z, 2368f.)

2247. EDEN, D. R. [A.].

**Coconut selection in Western Samoa.**

*Quart. Bull. S. Pacific Commiss.*, 1952, 2 (3):

37-8, from abstr. in *Documbl. trop. Prod.*

*Amst.*, 1952, 7: 807.

An account is given of the rehabilitation of the coconut estates and of coconut selection by the New Zealand Reparation Estates. Soil profiles, cultivation and cover cropping are dealt with. Selection is carried out mainly on native trees and, to some extent, on material imported from Malaya.

2248. ANON.

**Note on coconut trials.**

*Nyasaland agric. quart. J.*, 1951 (issued Nov. 1952), 10: 108-9.

Trial plots were laid down in several districts of Nyasaland in 1950 and 1951 with a view to determining whether widespread expansion is warranted. Preliminary observations suggest that under Nyasaland conditions the palm will not stand severe waterlogging for any length of time but requires a water table at 7-13 feet during the dry season. Conditions are probably suitable on the Lower River (Chikwawa and Port Herald) but there can be no future for the crop there until the Rhinoceros beetle harboured by *Hyphaene crinata* palms killed by tapping can be controlled.

2249. SANKARASUBRAMONY, H., AND OTHERS.

**Studies on backwater, river and canal silts as ameliorants of the loose coconut soils of the coastal tracts. Part 1. Poly-manurial qualities of the different silts.**

*Indian Coconut J.*, 1952, 5: 141-8, bibl. 3.

The annual application of silt to coconut plantations is a long-standing practice, especially where the soil is sandy. Silt samples were analysed and were found to have a combined silt and clay fraction of over 30% in many cases, compared with 5% or less in the coastal coconut soils, and to possess some manurial value. Field trials are being conducted with silts as soil improvers.

2250. MENON, K. P. V., NAIR, U. K., AND PANDALAI, K. M.

**Influence of waterlogged soil conditions on some fungi parasitic on the roots of the coconut palm.**

*Indian Coconut J.*, 1952, 5: 71-9, bibl. 12, illus.

Experiments at Kayangulam Research Station showed that waterlogging of the soil appears to favour the invasion of coconut palm roots by fungal parasites, among them *Rhizoctonia solani*, *R. bataticola* and *Botryodiplodia theobromae* in the order mentioned.



2251. MENON, K. P. V., AND NAIR, U. K.

Scheme for the investigation of the root and leaf diseases of the coconut palm in South India. Consolidated final report of work done from 8th March 1937 to 31st March 1948.

*Indian Coconut J.*, 1951, 5: 5-19, and 1952, 5: 81-100, 113, bibl. 18, illus.

The scheme was started in 1937 on account of the increasing severity of coconut diseases in Travancore and in 1948 was absorbed as part of the work of the newly established Central Coconut Research Station, Kayangulam. Attention was at first focused on the fungi associated with the diseases. *Helminthosporium halodes*, *Gloeosporium* sp., *Gladiadium roseum* and *Pestalotzia palmarum* are those associated with the leaf disease, and root disease symptoms were obtained in certain cases when *Botryodiplodia theobromae*, *Rhizoctonia solani* and *R. bataticola* were used as inoculum. Work done since 1945, however, suggests that the fungi may be secondary and the possibility is now being explored that the diseases may be of physiological or virus origin.

2252. MARICONI, F. A. M.

As lagartas das palmeiras. (Palm caterpillars.)

*Biológico*, 1952, 18: 103-7, bibl. 1.

In Brazil the caterpillars of *Brassolis sophorae* and *B. astyra* cause considerable damage to the leaves of palms, defoliation being complete in severe cases. The former is the more serious and is particularly injurious to coconut and carnauba palms (*Copernicia cerifera*) in north and north-east Brazil. The latter is serious on coconut palms in some districts. The geographical distribution, morphology and biology of the insects are described. There are four methods of control: cultural, artificial, biological and chemical. Cultural measures consist chiefly of keeping planted areas free from waste materials such as coconut husks which form good sites for pupation, and the elimination of unwanted host plants. An artificial control measure that can sometimes be employed is the removal by hand of the "nests" in which the caterpillars pass the day. The chief parasites of the pests are a *Telenomus* wasp which does great damage to the eggs, and the fly *Xanthozona melanopyga* which attacks the caterpillars. Chemical control of *B. sophorae* has been obtained with 2% BHC applied every 20-25 days until the pest is eliminated.

2253. NIRULA, K. K., ANTONY, J., AND MENON, K. P. V.

A new pest of coconut palm in India.

*Indian Coconut J.*, 1952, 5: 137-40, bibl. 5.

The cockchafer, *Lepidiota* sp., has recently been recorded for the first time as a root pest of the coconut palm in India (Travancore-Cochin and North Malabar). The white grubs, which occur in large numbers, feed voraciously on the roots, attacking them near the trunk and often severing them completely. Damp cool weather favours the grubs which do most damage during the early rains. Severe attacks cause yellowing of the leaves and premature nut fall and, in the case of young palms, stunting and delayed flowering. Descriptions are given of the adult, larva and pupa.—Centr. Coconut Res. Stat., Kayangulam.

2254. NIRULA, K. K., ANTONY, J., AND MENON, K. P. V.

Investigations on the pests of the coconut palm: The rhinoceros beetle (*Oryctes rhinoceros* L.): life history and habits.

*Indian Coconut J.*, 1952, 5: 57-70, bibl. 40, illus.

The paper begins with a review of the studies of other workers. The pest is serious in Travancore-Cochin, Madras, Orissa, Bombay, Saurashtra, Bengal and Assam. In India it has not been observed to be attacked by insect or fungal parasites at any stage. Its chief alternative hosts are *Borassus flabellifer*, *Phoenix sylvestris* and *Elaeis guineensis*.—Centr. Coconut Res. Stat., Kayangulam. [For control, see *H.A.*, 22: 966, 3060, 3061.]

### Coffee.

(See also 2367b, e, g, t, w, 2387.)

2255. THIRION, F.

Vingt années d'amélioration de la culture du caféier robusta à Yangambi. (Twenty years of improvement in robusta cultivation at Yangambi.)

*Bull. Inf. I.N.E.A.C.*, 1952, 1: 321-56, bibl. 5, illus.

A description is given of the selection of planting material originally obtained chiefly from Java and local sources at Lula and Yangambi. Yields of the best clones and strains are: original Java introductions—BG.105.03, 1,305 kg. of marketable coffee per ha.; clonal seed garden—L.130, 1,360 kg.; polyclonal—SA.158, 1,123 kg.; illegitimate strains—Y.410, 1,810 kg.; legitimate strains—SA.158, 1,158 kg. *Improvement of cultural methods.* (1) *Plantation management.* Experiments with different methods of preparing land for planting showed that the highest yield was given by complete clearance of the forest and burning (873 kg. saleable coffee per ha.), followed by complete clearing without burning but with the piling of the material in strips (674 kg.) and then by planting under thinned forest (325 kg.). A combination of the first two methods is the one employed. (2) *Planting density.* On burned land square or quincunx planting at 3×3 m. is current practice. On non-burned land 3 and 4 m. strips alternate, the coffee being planted in the former and the woody material being piled on the latter; average yields of dry beans per ha. when planting thus at distances apart in the lines of 3·6 m. (812 trees per ha.), 3·0 m. (957) and 2·0 m. (1,450) were 940, 1,016 and 1,102 kg. respectively. (3) *Planting method* experiments are also described. (4) *Shade.* Experiments conclusively proved the need for shade. Shading from the time of planting out somewhat reduced yield by delaying development, but this can be mitigated by introducing the shade plants 2-3 years after planting. The 2 best shade plants were *Croton mubango* and *Phyllanthus discoideus*. *Pruning.* Details are given of experiments in training by the single stem, multiple stem and agobiada methods. The highest yields were given by single stemmed bushes topped at 1·8 m. and subsequently subjected to cylindrical pruning. Maintenance pruning and rejuvenation pruning are also discussed. *Maintenance of soil fertility.* There was no significant difference between the yields of clean-weeded and selectively-weeded plots

and plots with leguminous hedges, whereas natural vegetation dominated by *Pennisetum purpureum* interfered with the development of the coffee. Lists are given of local weeds which constitute efficient cover crops and do not compete with the coffee, of similar indigenous and exotic plants which do compete to some extent, and of useful green manure crops. Even heavy mulching, a total of 300 tons per ha. applied over 7 consecutive years, had no effect on yields. Organic manures were beneficial in some cases.

2256. INDIAN COFFEE BOARD (THOMAS, K. M.).  
*Fourth Annual Report of the Research Department of the Indian Coffee Board 1950/51, 1952*, pp. 49, R. 1, being *Bull. Res. Dep. Indian Coffee Bd* 4.

The results of research at Balehonnur and Chethalli are reported in detail. *Botany*: breeding of arabica and robusta, vegetative propagation. *Chemistry*: manurial experiments including catalysation of nutrients, analysis of fallen coffee leaves and of shade tree leaves. *Agromony*: pruning, bed v. basket plants, early v. late pitting, date of transplanting from germination beds to baskets, basic yields, rejuvenation of old coffee, single v. multiple stems, hormones for preventing fruit drop, weed killers, germination tests, mulching, vegetative propagation, moss growth on stems. *Plant protection*: time and strength of bordeaux sprays, wetters and spreaders with bordeaux, copper sandoz and other Cu fungicides, black bean, white stem borer, green bug, abnormal leaf and fruit fall. *Robusta pulping experiments*.

2257. MENDES, J. E. T.  
 Ensaio de variedades de cafeeiros III. (Variety trials with coffee III.) [English summary ½ p.]  
 MORALES, A.  
 Análise estatística do ensaio de variedades de café: Parte II. (The statistical analysis of a coffee variety trial.) [English summary 8 lines.]  
*Bragantia*, 1951, 11: 29-43, bibl. 4; 44-9, bibl. 3 [received 1953].

An experiment with 6 varieties was laid down at the Central Experimental Station, Campinas, Brazil, in 1931. Results have been published for 1935-38 and 1935-46. [See *H.A.*, 21: 1049 and 2202.] Results for the years 1947 to 1950 and the period 1935-50 and a statistical analysis for the period 1937-50 are now published.

During 1947-50, yellow Bourbon (*Coffea arabica* var. *bourbon*) always gave the highest mean annual yield while the other varieties varied in order from year to year; yellow Bourbon gave the highest total yield followed by red Bourbon (*C. a.* var. *bourbon*), Sumatra (*C. a.* var. *typica*), Maragogipe (*C. a.* var. *maragogipe*), Nacional (*C. a.* var. *typica*) and Amarelo de Botucatu (*C. a.* var. *typica*); the earliest was Amarelo de Botucatu, followed by Sumatra, Nacional, red and yellow Bourbon and Maragogipe; Maragogipe yielded the largest beans followed by Nacional, Amarelo de Botucatu, Sumatra, and red and yellow Bourbon. During the period 1935-50 yellow Bourbon gave a significantly higher yield than red Bourbon, red Bourbon than Sumatra, and Sumatra than the 3 others, between which there was no significant difference; the

mean annual increase in yield was greater in yellow than in red Bourbon, and greater in Maragogipe than in Nacional and Amarelo de Botucatu.

Statistical data now show that the tendency of the yield of Amarelo de Botucatu to fall relative to the others has ceased. The yields of this variety and of Nacional and red Bourbon appear now to be stabilized as their rates of increase do not differ significantly from zero. On the other hand, Sumatra, Maragogipe and especially yellow Bourbon continue to show a tendency to increase in yield. These observations show that in addition to average yield the tendency to increase in yield can profitably be taken into consideration in selecting varieties. In the previous analysis it was not possible to choose between yellow and red Bourbon on the basis of yield alone but a study of their respective rates of increase in yield led yellow Bourbon to be chosen in preference to red Bourbon. As is now seen, the choice was justified.

2258. TREMLETT, R. K.  
 Bugusege Coffee Research Station.  
*Uganda Dep. Agric. Rec. Invest. No. 2, 1949-50, 1952*, pp. 52-4.

*1932 pruning and spacing experiment*: The lay-out consists of 5 blocks each containing 8 plots. Treatments are unlimited terminal growth (natural growth) and modified multiple stem, each at 8×8, 7×7, 6×6 and 4×4 feet. Since 1932 unlimited terminal growth has given an average of 2½ cwt. of cherry per acre per annum more than the modified multiple stem. The 4×4 feet spacing with unlimited terminal growth retains the lead owing to the advantage it accumulated in the earlier years. In the last 4 years modified multiple stem has surpassed unlimited terminal growth and the 6×6 feet spacing has outstripped all others. *1936 spacing, stumping and uprooting experiment*: The object is to investigate the advisability of rotational stumping of closely planted coffee as against uprooting alternate rows. Treatments were given at spacings of 3×3 ft., 4×3 ft. 9 in. and 5×5 ft. Uprooting of alternate rows was done after a few years and the spacings of this treatment are now 6×6 ft., 8×7 ft. 6 in. and 10×10 ft. Alternate rows on the 5×5 ft. spacing were stumped in March 1950. The 3×3 ft. spacing (uprooted 1939) leads in yield, followed by the 5×5 ft. spacing with rotational stumping. In the 3×3 ft. and 4×3 ft. 9 in. spacings with stumping the new growth from the stumping is crowded by the standing rows and is very poor and weak. *Replacement trial 1947*: From a trial to find the best way of replacing old coffee planted 6×6 ft. it is concluded that there is no difficulty in establishing young coffee in a 15-year-old plot using either 1-year-old seedlings or 2-year-old stumped transplants; that proximity of old coffee has no great effect on the height of young plants 2 years after planting; that, provided the coffee has been looked after, by far the most satisfactory way to resuscitate an old plot is to stump it instead of replanting.

2259. SUÁREZ DE CASTRO, F.  
 Potencialidad erosiva de las lluvias dentro de un cafetal y al aire libre. (The erosive force of rain in a coffee plantation and in the open.)  
*Bol. inf. Colombia*, 1952, 3 (32): 21-31, bibl. 6, illus.



Splatter-boxes consisting of a shallow perforated tray containing a known weight of sand and set on top of a glass bottle were used in experiments conducted by the Soil Conservation Division of the Colombia National Federation of Coffee-growers in 1949 and 1950. The weight of sand splattered out of the tray by the rain was taken as an index of the erosive force of the drops. In each of 47 showers the erosive force was greater in a plantation shaded by banana and *Inga* sp. than in the open. The results are discussed.

2260. U[RHAN], M.  
El sombrío en el cultivo del café. (Shade in coffee growing.)  
*Bol. inf. Colombia*, 1952, 3 (33): 27-30.

The results are given of exploratory experiments on the N content of leaves from shaded and unshaded coffee. First, leaves from trees in an unshaded plantation gave: (1) no chlorosis and low yield—2.66% N; (2) moderate chlorosis and yield—2.13%; (3) severe chlorosis and high yield—1.71%. Secondly, samples from two vigorous trees under good natural shade in different localities gave 2.3 and 3% N respectively. Thirdly, samples from vigorous, shaded, heavy-yielding trees and from severely chlorotic, unshaded, heavy-yielding trees with die-back symptoms in adjacent areas gave 2.55 and 1.81% N respectively. These results suggest that a relationship may exist between coffee yield, shade conditions and the level of nutrients in the soil.—Colombia nat. Coffee Res. Centre.

2261. FRANCO, C. M.  
A água do solo e o sombreamento dos cafêzais na América Central. (Soil moisture and the shading of coffee plantations in Central America.) [English summary  $\frac{3}{4}$  p.]  
*Bragantia*, 1951, 11: 99-119, bibl. 13 [received 1953].

In the State of São Paulo, Brazil, coffee does not do well under shade owing to competition for soil moisture between the coffee bushes and the shade trees, wilting point sometimes being reached to a depth of a metre after 2-3 months' drought. In studies made in Costa Rica and San Salvador to determine why coffee thrives under shade in apparently similar conditions in Central America it was found that neither the species of shade trees used, nor the intensity of shade, nor cultural methods nor the climate account for the difference. The governing factor is that in Central America the soil moisture remains well above wilting point after 4 or more months of dry season. A comparative study of the physical properties of Central American and São Paulo soils, especially their moisture-tension curves, may explain this difference.—Inst. agron. of Campinas. [See also *H.A.*, 22: 4358.]

2262. FRANCO, C. M., AND INFORZATO, R.  
Quantidade de água transpirada pelo cafeeiro sombreado e pelo ingazeiro. (The amount of water transpired by the shaded coffee bush and the shade tree.) [English summary  $\frac{1}{2}$  p.]  
*Bragantia*, 1951, 11: 121-5, bibl. 5 [received 1953].

Previous studies in São Paulo State, Brazil, showed that the shade tree (usually *Inga edulis*) competes with the coffee bush for soil moisture [see *H.A.*, 22: 4358]. To throw further light on this problem and to furnish

data for the study of the irrigation of coffee plantations the amounts of water transpired by *Inga edulis* and shaded coffee bushes were measured. The experimental methods used were those described in *H.A.*, 22: 4356. In the year of the experiment the amount of water removed from the soil in transpiration by 10-year-old *Inga* trees at  $10.5 \times 10.5$  m. and coffee at  $3.5 \times 3.5$  m. exceeded rainfall during the 6 months from April to September.

2263. URHAN, M.  
Análisis de hojas. (Foliar diagnosis.)  
*Bol. inf. Colombia*, 1952, 3 (33): 18-26, bibl. 10.

After introductory remarks on general principles, the method of sampling used by the Colombia National Coffee Research Centre and the results of an experiment are described. Leaves are taken from the 4th node from the tip (being considered to have recently reached full development) of middle branches, normally at the rate of 10 leaves per tree and 10 trees per plot. Sample leaves from stunted young robusta plants growing at the Centre, which showed different degrees of chlorosis between the veins, contained adequate Fe but only traces of Mn. The following three treatments were applied monthly to specimen plants from the plot and also to slow-growing arabica without obvious deficiency symptoms from an adjacent plot: (1) a 1.5% Mn sulphate spray; (2) soil application of 2 g. Mn sulphate as an aqueous solution; and (3) control. After 3 months the deficiency symptoms in treated plants had disappeared. Robusta and arabica showed great differences in rate of absorption of nutrients. Research continues.

2264. M[ACHADO] S., A.  
Experimentos sobre fertilizantes químicos y organicos en los cafetales. (Trials with chemical and organic fertilizers in coffee plantations.)  
*Bol. inf. Colombia*, 1952, 3 (32): 37-9.

Trials being conducted at Fusagasugá and Blonay by the Agronomy Section of the Colombia National Coffee Research Centre have given the following results to date. *Fusagasugá, Cundinamarca*: Yields in the four harvests 1948-9 to 1951-2 were highly significantly increased by organic manures but were not significantly increased by chemical manures. *Blonay, North Santander*: In the first year of the experiment yields were significantly increased by organic manures. This indicated the value of using such manures in the early fruiting years of a crop.

2265. LOTTI, B.  
Novos rumos da adubação na restauração dos cafêzais. Contribuição para a recuperação cafeeira. (A new fertilizer programme for the rehabilitation of coffee plantations.)  
*Bol. Super. Serv. Café*, 1952, 27: 816-27.

Coffee growing in São Paulo, Brazil, is suffering from a decline. Mistakes in manuring have been made through ignorance and antiquated fertilizer formulations which do not meet the requirements of degraded plantations are being employed. The use of P in such areas is dangerous as it encourages heavy fruiting. The classical formulations should be abandoned and the chief place should be given to N and K, which encourage growth and development, P being left out entirely in certain cases. Chilean nitrate is the best source of N,

and organic material of every kind should also be employed. Pruning should be preceded and accompanied by the application of nitrate, which tends to reduce attacks by leaf miner and other pests which attack the leaves. Irrigation without manuring gives unsatisfactory results.

2266. MACHADO S., A.  
Pronóstico de las cosechas del café.  
Algunos aspectos de los primeros trabajos  
exploratorios. (Forecasting coffee harvests.  
Some aspects of the first exploratory experi-  
ments.)  
*Bol. inf. Colombia*, 1952, 3 (36): 36-40,  
illus.

The final aim is the finding of mathematical formulae which will make possible yield estimates of one or more coffee plantations in given years within given limits of accuracy. The results of exploratory work with two different procedures for crops of different ages are discussed.

2267. MICHELMORE, A. P. G.  
Section of Entomology. General progress  
report. Coffee.  
*Uganda Dep. Agric. Rec. Invest. No. 2*,  
1949-50, 1952, pp. 13-15.

Notes are given on the two following pests among others: *Stephanoderes hampei*. The efficacy of the removal of dry cherries as a means of checking the borer was tested. The arrangement of the plots did not permit of a statistical lay-out, but of the older plots 6 had every tree carefully stripped of old cherries remaining from the previous crop, 15 had trees and ground cleared, one which always had a low infestation had all the pickings and sweepings from other plots strewn on the ground and the remainder were untreated. Counts of damaged cherries in the new crop showed no apparent effect of the treatments. *Biological control of Antestia*. *Corioxenos antestiae* was introduced into the Bumaso area of Mount Elgon in 1942 in *Antestia lineaticollis*. In February 1950 host and parasite were found to have decreased in numbers since an observation 19 months before. The rate of parasitization had not changed significantly. The proportion of the introduced *A. lineaticollis* to the native *A. faceta* continued to increase. Both the introduced bug and the parasite had spread slightly, the spread of the latter being still roughly parallel with that of the former.

2268. MORALES M., E.  
Observaciones sobre algunos insectos de  
importancia económica en el cultivo del  
café. (Notes on some insects of economic  
importance in coffee growing [in Costa  
Rica].)  
*Suelo Tico*, 1952, 6: 31-6.

*Nursery pests*. The most serious is *Phyllophaga* sp., the larvae of which attack the roots; control is difficult but some success has been obtained with chlordane and lindane. Cutworms of *Agrotis*, *Feltia* and *Prodenia* spp. also do considerable damage; effective control is obtainable with poison bait consisting of one part 40% chlordane to 40 parts rice bran plus water. *Plantation pests*. *Neorhizococcus coffeae*, which is associated with the ant *Acropyga* (*Rhizomirma*) sp., attacks the roots; control experiments with 1-2% aldrin or

lindane at 2 l. per plant have been promising. *Atta* sp. are a serious problem in certain areas; chlordane and aldrin give good control. *Rhabdopterus jansoni* was first observed in 1948; the leaves and beans are attacked; 7% chlordane gives good control.

2269. GONZÁLEZ MENDOZA, R.  
Algunas investigaciones relativas a la mosca  
de las frutas y cerezas de café (*Anastrepha*  
spp.). (Some investigations concerning the  
fruit and coffee berry fly, *Anastrepha* spp.)  
*Bol. inf. Colombia*, 1952, 3 (32): 32-5.

*Anastrepha* is an important fruit pest in Colombia. Nine species have been recorded. All are found below 2,000 m. and at temperatures ranging from 14° to 30° C. *A. fraterculus* attacks 40 different fruits, most of them of economic importance. Morphological notes are given. Moderate humidity and temperature suit the fly best. Strong acidity is inimical to egg, larva and pupa. The texture and humidity of the soil determine the depth and rapidity of pupation. For effective control a combination of artificial, cultural and biological methods is necessary. A list is given of insecticides which are effective when applied either to the plant, or to the soil at the time of pupation. Cultural measures include (1) bagging of fruit, (2) removal and burial of infected fruit, or its use to favour multiplication of the parasites of *Anastrepha*, (3) shallow cultivation and saturation of the soil at pupation time. Quarantine measures are refrigeration of the fruit and steam sterilization of the refrigerators.

2270. SWAIN, R. B., AND MORALES, E.  
Los grillos del café en Nicaragua. (Coffee  
crickets in Nicaragua.)  
*La Hacienda*, 1952, 47 (7): 48-9, from abstr.  
in *Bol. inf. Colombia*, 1952, 3 (34): 3.

During the last 3 years many coffee plantations at 1,500-2,000 ft. above sea level in the Managua mountains have been attacked by *Idiarthron atrispinum*. The insect attacks green and ripe fruits, leaf blades and young shoots. It has hosts other than coffee. Control has been achieved in the laboratory with 20% toxaphene, 2½% aldrin and 10% chlordane. At least 3 applications are recommended, the shade and cover plants being sprayed as well as the coffee.

2271. BERRY, P., AND CALDERÓN, R.  
El chacuete en el café. Métodos recomen-  
dados para su control. (*Idiarthron sub-  
quadratum* and its control.)  
*Circ. agric. Santa Tecla* 54, 1952, from abstr.  
in *Bol. inf. Colombia*, 1952, 3 (35): 3.

*Idiarthron subquadratum* has been a serious menace to the coffee industry in El Salvador in recent years and has caused a 15% yield reduction in places. It attacks not only seeds but also young shoots and flower buds, thus reducing the harvest the following year. Recommended control measures are the cleaning of plantations at the beginning of the larval stage and the use of insecticides.

2272. SUNDARAM, S.  
Some new organic and systemic insecticides  
for the control of green bug of coffee.  
*Indian Coffee*, 1952, 16: 195-202, bibl. 4,  
and *Plant. Chron.*, 1952, 47: 657-63, bibl. 4.  
Sprays or soil applications of a number of insecticides,



some at several concentrations, were compared in 2 areas for the control of *Lecanium viride*. From the results, which are set out in full, it is concluded that the 2 most effective economic sprays were Ekatox liquid (20% parathion) at 0.2% and HETP (tetra ethyl pyrophosphate) at 0.125 to 0.25%, the latter being the cheaper and safer to use. Under conditions of heavy infestation fish oil and Honge oil rosin soaps were less effective and more expensive. Among several systemics applied to the soil, BFPO (bis-dimethyl-amino-fluoro-phosphine-oxide) reduced attacks markedly and is to be the subject of further trials.

2273. JUNQUEIRA, G. M.

*Pantomorus godmani* (Crotch): um depredador ocasional do cafeeiro. (*Pantomorus godmani* (Crotch): an occasional pest of coffee.)

*Solo*, Piracicaba, 1952, 44 (2): 51-8, bibl. 30, illus.

The literature on the distribution, biology and control of *Pantomorus godmani* is reviewed. This beetle feeds on a wide range of plants including fruit trees, sugar cane and ornamentals, the larvae attacking the roots and the adults the leaves. In 1951 a heavy infestation was observed on a coffee plantation in Brazil.

2274. TOSELLO, A.

O ponto de armazenamento do café em coco. (The storage of coffee beans.) [English summary 12 lines.]

*Bragantia*, 1951, 11: 171-7, bibl. 1.

Coffee berries are normally dried to 18% moisture content, in which condition they can readily be decorticated by hand before storage. Experiments were conducted at Campinas Institute of Agronomy, Brazil, to determine whether coffee could be stored at a higher m.c., as this would be more economical. Preliminary conclusions were that in the Campinas climate beans can be stored at 24% m.c. without danger of micro-organism infection and without impairing taste or colour. Storage at 24% m.c. permits the curtailment of the drying period by 24-30%.

Guavas.

2275. GURGEL, J. T. A., AND OTHERS.

Fatores que afetam a determinação da vitamina C na goiaba (*Psidium guajava* L.). (Factors affecting the determination of vitamin C in guava.)

*An. Esc. sup. Agric. "Luiz de Queiroz"* Piracicaba, 1951, 8: 399-432, bibl. 14 [received 1953].

The vitamin C content of the guava was studied in relation to 4 factors. Degree of maturity. Vitamin C content in mg./100 g. fruit in fruits of different degrees of maturity were: green fruit 102, ready for picking 83, firm ripe 90, soft ripe 77. Influence of sunlight. Exposed parts had a higher content than shaded parts of the fruit. Distribution in the fruit. Content decreased from the outside towards the centre and was highest in the basal portion of the fruit. Cold storage. After storage periods of 12, 24, 48 and 96 hours the decreases in content were 24, 42, 67 and 76% respectively. The 5 methods of sampling employed are discussed.

Mangoes.

2276. RICHARDS, A. V.

The mango (*Mangifera indica* L.).

*Trop. Agriculturist*, 1952, 108: 121-4, bibl. 1.

Notes are included on the varieties recommended for Ceylon, namely Jaffna or Vellai colomban, Karutha colomban, Ambalavi, Willard, Neelam and Peterpassand. Propagation is mainly by H budding or cleft grafting on sour (Walamba) or fibre (Kohuamba) stocks, seedlings of the latter, which is polyembryonic, being preferable. Brief notes are included on planting, manuring, harvesting, and disease and pest control.

2277. NIRVAN, R. S.

"Bunchy top" of young mango seedlings.

*Sci. and Cult.*, 1953, 18: 335-6, bibl. 4, illus.

A bunchy top disease of young mango seedling rootstocks observed in a nursery at Saharanpur is described. Between November 1951 and March 1952 the percentage of affected plants rose from 0.7 to 1.3. Investigations on the cause of disease are in progress.

2278. PATEL, G. A., AND PATEL, H. K.

Control of termites as pests of fruit trees.

*Proc. zool. Soc. Bengal*, 1952, 5: 133-40, bibl. 25.

In Bombay State, termites, notably *Trinervitermes biformis*, damage certain field and vegetable crops following disease attacks and also do direct injury to such fruits as chiku (sapodilla), pomegranate, guava, citrus and especially mango. Among several insecticidal preparations tested on the stems of infested mangoes 5% DDT in light oil and 5% BHC (13% gamma) in crude oil gave the best protection. The 5% DDT is recommended particularly for older trees with diameters over 9 in. On younger trees some phytotoxic effects were noticed and for these a 2% aqueous solution is suggested.

2279. SINGH, R. S., AND GUPTA, A. P.

Exports trial of U.P. mangoes to United Kingdom in 1950.

*Agric. Anim. Husb. U.P.*, 1950/51, 1 (7/8): 6-11 [received Dec. 1952].

Dashehri mangoes wrapped in tissue paper, packed in 3 layers in bamboo baskets lined with paper, and despatched by air from Lucknow to London via Delhi, were in generally good condition on arrival 4-6 days later. Khajri (=Samar Bahisht or Chausa) mangoes showed rather more wastage. Costs and returns are tabulated and discussed.

Oil palms.

2280. DE BLANK, S.

A reconnaissance of the American oil palm, *Elaeis melanococca* (Gaertner (em. Bailey) = *Corozo oleifera* (Giseke) *Alfonsia oleifera* (H.B.K.)).

*Trop. Agriculture Trin.*, 1952, 29: 90-101, illus.

*Elaeis melanococca* is widely distributed in Brazil, the Canal Zone, Panama, Costa Rica, Colombia and Surinam. Despite the poor fruiting qualities of the palm, its short trunk, but not its procumbency which would create difficulties under plantation conditions, is a character of sufficient interest to warrant crossings

with high-yielding strains of *E. guineensis*. Its apparent freedom from many of the diseases to which *Elaeis guineensis* is subject is another important character. Procumbency, which is not a constant character, appears to be due to genetical and/or environmental factors.

2281. KOVACHICH, W. G.  
**Abnormal roots in oil palms in the Belgian Congo.**  
*Trop. Agriculture Trin.*, 1952, **29**: 29-34, bibl. 2, illus.

A root survey of healthy and diseased palms in 1950 showed that many of the young roots are abnormal or diseased in palms severely affected by bud rot, patch yellow, plant failure, vascular wilt and leaf bend, while old roots are most severely affected in vascular wilt and plant failure. Abnormal leaf conditions are associated with the development of abnormal or diseased roots. In general, the condition of the young roots is reflected in the habit of the young leaves which are more erect than normal. In palms under 14 years of age erect old leaves are associated with badly diseased old roots but in older palms (except those suffering from plant failure) wilting of the old leaves is a more common disease symptom than erect habit. The erect leaf habit apparently results from a physiological disturbance.

2282. KOVACHICH, W. G.  
**Little leaf disease of the oil palm (*Elaeis guineensis*) in the Belgian Congo.**  
*Trop. Agriculture Trin.*, 1952, **29**: 107-14, bibl. 3, illus.

Bud rot and little leaf are two stages of the same disease which is now called little leaf disease. Notes are given on its symptoms, incidence and spread. Investigation shows that the disease is either of physiological or virus origin. The susceptibility of palms appears to be influenced by fruit production and soil conditions.

### Papaws.

(See also 2367m, s, 2368b.)

2283. SINGH, L. B.  
**The culture of papaya.**  
*Agric. Anim. Husb. U.P.*, 1951, **2** (3): 23-5 [received Dec. 1952].

This short account of papaw cultivation includes a tabulated statement of costs and returns for an irrigated 5-acre plantation [in Uttar Pradesh].

2284. VENKATARAMANI, K. S.  
**An interesting instance of "viviparous" germination in *Carica papaya* L.**  
*J. Madras Univ., Sect. B*, 1951, **21**: 218-19, bibl. 4, illus. [received Dec. 1952].

Although seed germination within papaw fruits appears to be a common occurrence, the case described here was remarkable in that the cotyledons were distinctly green. It is suggested that the content of protochlorophyll may have been so highly developed that chlorophyll was formed immediately the fruit was opened and the seedlings exposed to light.

2285. BIRD, J., AND ADSUAR, J.  
**Viral nature of papaya bunchy top.**  
*J. Agric. Univ. Puerto Rico*, 1952, **36**: 5-11, bibl. 8.

DDT effectively controls the leafhopper, *Empoasca papayae*, which is the vector of the papaw bunchy top disease [see *H.A.*, 18: 691e], for the viral nature of which strong evidence is here presented. If, however, occasional trees become infected these can, in commercial practice, be replaced by seedlings. Thanks to the very slow downward spread of the causal agent the restoration of infected trees by topping them below the point of infection has been found possible on an experimental scale (without a study of the effect on the yield). Infected portions can readily be determined by the fact that latex fails to flow when they are pricked. [For previous abstract, see *H.A.*, 22: 3090.]

2286. TROUT, S. A.  
**Papaws.**  
*A.R. Qd Dep. Agric. Stk* 1951/52, 1952, pp. 61-2.

Papaws are ripened commercially in winter in heated rooms, a process which softens and colours them before surface mould can develop. They require to be at quarter- and half-colour stage to develop satisfactory colour on ripening. Their flavour is poor compared with naturally ripened fruit but they are particularly suitable for canning. Experiments showed that fruit ripened most satisfactorily after 2 days at 85° F. using a concentration of 1 part coal gas to 1,000 parts air 5 times per day. Summer fruit is better preserved by quick-freezing owing to its softer texture.

2287. SMITH, E. H. G.  
**Papain: its production and market.**  
*Colon. Plant Anim. Prod.*, 1952/53, **3**: 1-12, bibl. 19.

This review article is concerned with producing countries, production methods and the market for papain and its uses. The main producing countries are Ceylon, Tanganyika and Uganda, and 93% of their output goes to the United States.

### Pineapples.

2288. HERNANDEZÁ-MEDINA, E.  
**Filter press cake increases pineapple yields in Puerto Rico.**  
*Bull. P.R. agric. Exp. Stat. Rio Piedras* **104**, 1952, pp. 38, bibl. 16, illus.

Red Spanish slips were grown in 2 types of clay soil in drums in the open in 2 randomized block experiments begun in 1947. The following 5 treatments replicated 10 times were given: (1) Ca carbonate added to raise pH to 6.2; (2) Ca carbonate added to raise pH to 7.2; (3) sugar mill filter press cake mixed with the top 6 in. of soil in amounts equivalent to 10% of the weight of soil; (4) one 3% ferrous sulphate spray given 4 months after planting; (5) control. All 5 treatments received 12-6-10 commercial pineapple fertilizer at 1½ tons per acre, 4 applications being made during the vegetative cycle according to normal commercial practice. The experiments were designed to indicate remedial treatments which would counteract the adverse effects of Fe-Mn imbalance in the soil upon growth, development and production. By comparison with those under other treatments filter press cake pineapples showed better development and significantly or highly significantly



better yields (with one exception), produced the greatest number of slips and suckers, and had significantly superior green and dry weights. Increase in soil pH caused reduction in fruit yields, slip and sucker production, weight of suckers and green and dry weight of plants. No definite relationship was found to exist between the Fe and Mn contents of the plant tissue (except in one case) or of the soil and the yield of pineapples.

2289. HERNÁNDEZ-MEDINA, E.

**The apparent degeneration of pineapple slips in Puerto Rico.**

*J. Agric. Univ. Puerto Rico*, 1952, 36: 302-17, bibl. 17.

Puerto Rico pineapple growers are confronted with a serious decline in vigour of pineapple slips which lowers yields and results, after about 2 generations, in difficulty in obtaining slips of proper planting size. The suggestion that this might be due to a low Fe/Mn ratio led to a study of the relationship of these 2 elements. In field experiments begun in 1948 Cuban slips (imported from Cuba and planted for the first time in Puerto Rico) and native slips (from plants grown in Puerto Rico but originating from Cuba) of the Red Spanish variety were employed. Each group received 4 treatments: (1) soil application of Ca carbonate to raise the pH to 6.2 (the treatment normally given by growers where Mn is in excess) plus 2 Fe sprays (Fe sulphate at 25 lb. per 100 gal. water); (2) the same Ca carbonate treatment plus 4 Fe sprays; (3) 2 Fe sprays; and (4) 4 Fe sprays. The results of the experiments, which are given in detail, suggest that the apparent degeneration is not due to a low Fe/Mn ratio.

2290. TROUT, S. A.

**Pineapples.**

*A.R. Qd Dep. Agric. Stk* 1951/52, 1952, p. 59.

**Herbicides:** PCP is widely used as a pregermination spray, but the cultural treatments which must necessarily precede spraying are hampered by wet weather. An emulsified oil containing a high proportion of aromatics can, however, be added to deal with broad-leaved weeds. Combined sprays are less effective against grasses but they kill back the epigeal parts of most species and eradication with implements is thus simplified. The best contains 5 lb. PCP and 2 gal. oil to 100 gal. water. **Flower induction** for a uniform summer crop by the application of alpha-naphthaleneacetic acid in May was introduced at Maroochy Experiment Station some years ago and results have been sufficiently good to focus attention on its value in commercial practice. The plants must be large enough at the time of treatment to bear fruit of commercial size.

2291. MILLER, E. V., AND HEILMAN, A. S.

**Ascorbic acid and physiological breakdown in the fruits of the pineapple (*Ananas comosus* L. Merr.).**

*Science*, 1952, 116: 505-6, bibl. 3.

In pursuance of earlier work by the senior author, which had pointed to a relationship between physiological breakdown and loss of ascorbic acid in chilled pineapples, pineapple fruits harvested in the "mature green" or "market ripe" stage of maturity were subjected to two storage treatments. One lot was held at

room temperature (25-30° C.) for two days and then analysed, the other lot was kept at 6° C. for one week and then held at room temperature for two days. While the content of other constituents did not differ in the two lots, the ascorbic acid content in the juice of the refrigerated fruits was reduced by 38.9%. As no discoloration of the flesh or deterioration of flavour occurred, the authors assume that the storage period was interrupted before any visible symptoms of chilling had appeared and they conclude that destruction of ascorbic acid constitutes the first phase in the development of low-temperature injury. Further reasoning suggests that the darkening of the flesh in pineapples and chilling injuries in tropical fruits generally are due to the oxidation-reduction process being stopped in the quinoid stage. The fact that immature fruits are more susceptible to physiological breakdown than mature fruits tends to confirm the theory, because of the larger content of phenols in the form of soluble tannins in the immature fruits.—Univ. Pittsburgh, Pennsylvania.

**Rubber trees.**

(See also 2367d, 2368h.)

2292. VOLLEMA, J. S.

**Jeugdselectie bij hevea. (Selection of young hevea trees.)** [English summary 3 pp.]

*Arch. Rubbercult.*, 1952, 29: 31-63, bibl. 29.

Several trials on the selection of hevea trees at an early age were carried out at the Tjomas and Pewaja Experimental Stations in Indonesia. It was confirmed that growth records were not a satisfactory basis for selection in the nursery. Growth selection made in the field, however, is useful, as the selected seedlings will be substantially larger than the unselected ones when they reach tappable age. A small-scale trial indicated that pricktap selection in the nursery is of doubtful value. Pricktap selection in the field, however, may result in important increases in yield. Selection based on growth records appeared to have less effect on future yield than pricktap selection, whether carried out in the nursery or in the field. Selection in the nursery was always less effective than selection in the field. Selective thinning of 3- and 4-year-old seedlings, based on test tapping, appeared to be of some value, especially with seedling material of great variability. Test tapping at the age of 4 years gave better results than at the age of 3. Selective thinning on a basis of girth measurements at the age of 3 and 4 years was of less value than selective thinning by test tapping. None of the above-mentioned methods could be used to select trees with outstandingly high yields suitable for mother trees.

2293. DE SILVA, C. A.

**Yields of budded rubber and clonal seedlings in commercial tapping.**

*Quart. Circ. Ceylon Rubb. Res. Inst.*, 1951 (published 1952), 26 (3/4): 6-11 + tables.

The yield data presented cover the period up to the end of 1950 and are derived from figures relating to nearly 16,000 acres [see also *H.A.*, 21: 2068]. TJ.1 continues to represent the largest budded rubber acreage, is the control with which other clones are compared, gives average yields of 750 lb./acre per annum up to the 5th

year of tapping and of over 800 up to the 11th, and is recommended for large-scale planting except in very exposed areas. TJ.16 gives satisfactory yields and is recommended for large-scale planting in drier districts. BD.10 was removed from the large-scale planting list on early observations but results now presented from a small area compare very favourably with TJ.1. GL.1 again showed excellent results, often giving higher yields per tree than TJ.1; it was excluded from planting programmes owing to instability of the latex, but it may be possible to overcome this. PB.86 is the best for large-scale planting at present and its inclusion for planting up to 50% of the total acreage replanted is justifiable where previous experience has shown yields are up to standard. MK.3/2 and WG.6278 are still recommended for wet low areas. AV.255, PR.107, LCB.1320 (CHM.2), PB.6/50, RRIM.501, 513, 500, LUN.N, and WAR.4, and also Prang Besar Isolated Garden and Tjikadoe clonal seedlings are promising.

2294. CRAMER, P. J. S.

**Clonal seedlings.**

*Quart. Circ. Ceylon Rubb. Res. Scheme*, 1951 (published 1952), 26 (3/4): 16-35, bibl. 17.

Clonal seedlings are quicker and cheaper to establish than bud grafts but are more demanding and more risky. Their yields may be as high and they come into tapping earlier. Yields per tree are more variable and plantations of clonal seedlings therefore benefit more from drastic thinning. There is no correlation between yield and brown bast. Some modern commercial clonal seedlings and clones give optimum production in their youth under less intensive tapping systems and the application of heavy systems may be disadvantageous as regards bark consumption, tapping cost, frequency of brown bast and other diseases.

2295. RUBBER RESEARCH INSTITUTE OF MALAYA.

**Seed gardens for estates.**

*Plant. Bull. R.R.I.M.*, 1953, No. 4, pp. 14-21.

Recommendations are made on the layout of simple and manageable seed gardens suitable for estates or for the larger smallholdings.

2296. WARMKE, H. E.

**Studies on natural pollination of *Hevea brasiliensis* in Brazil.**

*Science*, 1952, 116: 474-5, bibl. 1.

In continuation of the co-operative work of the Division of Rubber Plant Investigations, Beltsville, Md, and the Mayagüez Experiment Station, Puerto Rico [see *H.A.*, 22: 1945], the author found that in the Amazon Basin natural pollination of *Hevea brasiliensis* is effected by several heleid midges, chiefly of the genus *Atrichopogon*. In Puerto Rico thrips were shown to be agents of pollination besides these midges.

2297. KAIMAL, K. N.

**Weeds and cover plants in rubber plantations.**

*Plant. Chron.*, 1952, 47: 575-81.

A general discussion of the problems associated with weeds and cover crops, based largely on Malayan experience, is followed by some observations on the behaviour of *Pueraria phaseoloides*, the best cover crop for rubber in South India, in relation to the effects of shade and competition from grasses.

2298. RUBBER RESEARCH INSTITUTE OF MALAYA.

**Manuring of young rubber plants.**

*Plant Bull. R.R.I.M.*, 1953, No. 4, pp. 9-13.

Leaf yellowing in the nursery may be due to Mg or K deficiency among other causes. It is wise to mix an Mg compound with the soil in the nursery, especially if using Prang Besar planting material. K deficiency can be induced by frequent applications of phosphate during early growth but can be avoided by using a complete rather than an NP fertilizer.

2299. JOHN, K. P.

**A hitherto undescribed leaf disease of hevea rubber caused by a species of *Colletotrichum*.**

*J. Rubb. Res. Inst. Malaya*, 1952, 14: 11-19, bibl. 10, illus., being *Commun.* 278.

The symptoms, morphology, cultural characters and pathogenicity of this leaf spot fungus of young rubber are described. Its relationship to other similar fungi is discussed.

2300. HILTON, R. N.

**Bird's eye spot leaf disease of the hevea rubber tree caused by *Helminthosporium heveae* Petch.**

*J. Rubb. Res. Inst. Malaya*, 1952, 14: 42-82, bibl. 56, illus., being *Commun.* 280.

The geographical distribution, economic importance and symptoms of the disease and the morphology, physiology, pathogenicity and ecology of the fungus are described in detail. A review of the literature on the fungus is included. The disease is of importance in bringing about general weakening and defoliation, thus causing plants to take longer to reach the optimum stage for transplanting and budding and interfering with planting programmes and the early development of new plantings. Growth of plants in sunlight and immaturity of leaf must coincide if the disease is to develop. Different degrees of shade or age influence infection to the point when either heavy shade or a mature horizontal leaf prevent it altogether. No economic method of fungicidal control can yet be claimed, but Cu fungicides are promising under certain conditions.

2301. DARLEY, E. J., AND SILVERBORG, S. B.

**Black thread of *Hevea brasiliensis* in Liberia.**

*Phytopathology*, 1952, 42: 547-58, bibl. 16, illus., being *Sci. J. Ser. Pap. Minn. agric. Exp. Stat.* 2827.

What appeared to be a new disease of the tapping panel on TK.12 proves to be a serious manifestation of the black thread disease [*Phytophthora palmivora*] in which a prevalent and virulent strain attacks a particularly susceptible clone. The severe form is also found to some extent on old trees of Avros 50, Tj.16, BD.5 and BD.10, though the 2 last appear to have some resistance under field conditions. The application of fungicides offers a better practical means of control than the use of resistant clones or changing the tapping system. Of some 10 compounds tested Socony Vacuum Product EF 487.2 was the best. It gave very good control and visibly stimulated bark renewal. It should be applied at least twice weekly.



## 2302. GOODING, E. G. B.

**Studies in the physiology of latex. III. Effects of various factors on the concentration of latex of *Hevea brasiliensis*.***New Phytol.*, 1952, 51: 139-53, bibl. 11.

A description is given of experiments conducted to study the effects of resting and tapping periods on the latex *in situ* and during tapping, on the dilution reaction, and on yield. For the effect of resting a single tree of Pilmoor B84 was observed and for the other experiments 4 trees each of Pilmoor B84 and R.R.I.501 were used. There was a maximum concentration for the latex in the vessels and this was reached 2-3 months after tapping ceased. Tapping led to a dilution which increased rapidly with successive tappings, and the volume of latex increased as a greater area of bark became affected. Greater intensity of tapping usually led to lower concentration of the latex. This appeared to result from the removal of greater quantities of rubber at each tapping which caused a lower concentration *in situ*, the latter, in turn, apparently leading to a more rapid regeneration of rubber. Seasonal changes in latex concentration associated with wet and dry periods were found to be relatively small. Wintering caused a severe drop in yield, apparently associated with the diversion of food materials to growth and possibly with an osmotic loss of water from the latex vessels.—Rubb. Res. Inst., Malaya.

## 2303. GOODING, E. G. B.

**A note on Pyke's dendrometer.***New Phytol.*, 1952, 51: 258-9, illus.

An account is given of a dendrometer constructed in 1941 but not previously described. The author reconstructed the instrument from portions found in the laboratories of the Rubber Research Institute of Malaya after the war. [For notes on its use, see *Nature*, 1941, 148: 51-2; *H.A.*, 11: 1404.]

## 2304. RUBBER RESEARCH INSTITUTE OF MALAYA.

**A comparison between alternate-daily A.B.C. (periodic) and third-daily tapping systems.***Plant. Bull. R.R.I.M.*, 1952, No. 1, pp. 8-11.

Experiments indicate that old, low-yielding areas with poor bark renewal may be expected to derive greater benefit from long periods of complete rest provided by the "A.B.C." alternate-daily periodic system than from the amount of rest provided by the third-daily system, but that on young or mature high-yielding trees with ample bark reserves the third-daily system has certain advantages.

## 2305. ANON.

**Plastic latexcups.***Plastica*, 1951, 4: 377, illus., from abstr. in *DocumBl. trop. Prod. Amst.*, 1952, 7: 55.

A note on the value of plastic latexcups, which are light, transparent and proof against corrosion. The cup film can be easily removed, which helps to prevent pre-coagulation.

## 2306. RUBBER RESEARCH INSTITUTE OF MALAYA

(WREN, W. G.).

**Annual Report of the Chemical Division of the Rubber Research Institute of Malaya for 1951, Kuala Lumpur, 1952, pp. 26.**

The projects relating to latex were as follows: *Chemical and physical properties of latex*: non-rubber constit-

uents (proteins, phospholipins and lutoids); changes occurring in ammoniated latex; injection of *Hevea brasiliensis* with Cu, etc. *Chemistry and technology of latex*: quality of latex concentrate; latex testing methods; preservation of latex; discoloration of rubber from santobrite latex. *Preparation practice*: factory procedure.

*Quality of latex concentrate* (pp. 11-12): Deterioration of latex during shipment and storage is usually due to the formation of acids. The presence of volatile acids is due to lack of care in collection, and particularly to the use of insufficient ammonia for preservation before processing and to late ammoniation, which allow bacterial infection to occur. The development of volatile (but not non-volatile) acids has been inhibited experimentally in lightly ammoniated (0.2%) latices by small quantities of certain bactericides, and is inhibited in more heavily ammoniated (0.5%) latices by certain metals known to be enzyme poisons. A marked improvement in the mechanical stability of latex has been obtained in experiments in progress by the addition to field latex of 0.03% lauric acid and 0.03% ammonium dihydrogen phosphate.

## 2307. CLOUAIRE, J.

**Contribution à l'étude du séchage du caoutchouc de plantation. (Contribution to the study of plantation latex drying.)***Rev. gén. Caoutch.*, 1953, 30: 34-8, 113-17, bibl. 16.

Three methods of drying latex are compared. *The convection (hot air) method* is that by which all sheet and crêpe are dried at present, but it cannot be used in a continuous process owing to the slow rate of drying. Analysis of sheets dried by natural ventilation and forced draught shows the advantage of the latter method. *The conduction method (hot plates and drums)* is more economical, but the correct length of drying cannot yet be established. *The radiation (infra red) method* can only be employed profitably for thin sheets (about 1 mm. thick). For a 2 mm. sheet the drying period would be about 24 hours by convection and 30 minutes by radiation. The energy required to produce 1 kg. dry material is approximately 2,500 watt-hours by the convection method, 1,500 by conduction and 900 by radiation.

## 2308. RUBBER RESEARCH INSTITUTE OF MALAYA.

**Poisoning rubber trees with sodium arsenite.***Plant. Bull. R.R.I.M.*, 1952, No. 1, pp. 3-7, illus.

Further studies have been conducted on the ring-barking method [see *H.A.*, 19: 3460]. The best width of ring is 8 in. The lethal dose for old trees on coastal soil is over 2 oz. per tree and on inland soils about 1.5. A suitable paste consists of 10 lb. sodium arsenite for trees on coastal soils (5 lb. for inland soils) plus 6 oz. tapioca starch to 1 gal. water. 1 gal. of this mixture will poison 50 trees. Poison must be applied immediately after ring-barking. Trees which do not die may be re-poisoned but this must be done in living tissue above the former ring. Leaf-fall occurs in 4-6 months on coastal soil and in about 3 on inland soil. Heavy branches start falling 6-8 months after leaf-fall. Trunks may stand 2-3 years; while some fall heavily, others come down in fragments. The extent and type of damage done by poisoned trees to young stands are discussed;

a 10-15% increase in initial planting density is recommended to offset it. Poisoning can be used in thinning, with little danger of damaging neighbouring trees if minimum doses are used. Poisoning cost per tree including labour is 13·4 cents using the 10 lb. solution and 9·4 cents with the 5 lb. solution.

2309. RUBBER RESEARCH INSTITUTE OF MALAYA.  
A note on *Hevea spruceana*.  
*Plant. Bull. R.R.I.M.*, 1952, No. 1, pp. 12-15, illus.

*Hevea spruceana* has no characters to recommend it and as it crosses readily with *H. brasiliensis* it could constitute a danger through introgressive hybridization. The object of the note is to stress its undesirable qualities and ask for co-operation in preventing its establishment. The flower, fruit and seed characters of the two species are illustrated as an aid to identification.

2310. READER, D. E.  
Gutta-percha.  
*Colon. Plant Anim. Prod.*, 1952/53, 3: 33-45, bibl. 14.

This review article includes information on *Palaquium gutta*, *P. oblongifolium* and other sapotaceous trees, mostly of the same genus, which yield gutta-percha latex, the planting and shading of young trees, insect pests, tapping and the harvesting of leaves, twigs and bark, yields, methods of extraction and the chemical and physical properties of gutta-percha.

### *Sugar cane.*

(See also 2367a, h, j, o, q, u, x, y, 2368e, g, i, 2373, 2394.)

2311. HILADO, A.  
The economics of sugar cane farming. I, II and III.  
*Sugar News*, 1952, 28: 338, 480-1, 481.

Mathematical formulae are given whereby a planter can calculate (1) his future potential profit from past and current costs and an estimate of market condition and some plantation factors; and (2) the yield that any farm operation (such as hoeing) must produce to justify its expense.

2312. KNOWLES, W. H. C., AND CAMERON, C.  
Field experiments with sugar cane. XX.  
*Sugar Bull. Brit. Guiana Dep. Agric.* 20, 1952, pp. 1-33.

Fifty-three varietal, 9 manurial and 2 irrigation trials are described. *Varietal trials*: B.34104 occupies 60% of the Colony's acreage but, owing to poor performance in trials (98·79 mean sucrose yield compared with the standard B.41227, 100) and heavy infestation with leaf scald, it is being replaced by B.37161 and B.41227. B.41227 occupies 13% of estates' acreage, gives promise of becoming a major variety and is being used as the standard in all new trials. On the basis of sucrose yields D.62143 (122·29) continues to show merit; B.43214 (128·29), although used in a limited number of tests only, is very promising; B.40105 (116·57), B.4362 (110·68) and B.4098 (100·69) deserve the attention of the industry; and D.37/45 (119·25) is also worthy of note. *Manurial trials* indicated that: (1) the use of phosphatic manures does not appear to be economic; and (2) sulphate of ammonia at higher levels than the

standard 4 cwt. per acre has no marked effect in first ratoons on Pegassy and Riverside clay. *Irrigation trials*: In trials begun in 1950 on Frontland clay irrigation by gravity canal and by overhead sprinkler gave no significant increase in yield over the unirrigated control.

2313. QUEENSLAND.  
Fifty-second Annual Report of the Bureau of Sugar Experiment Stations 1951/52, Brisbane, 1952, pp. 55.

The report records extended plantings of the popular varieties Q.50 and Pindar; increased use of velvet beans as green manure; continuation of gradual potash depletion of cane soils; expansion of weed control with 2,4-D; soil investigations on organic matter decomposition, clay minerals and krillium; effective use of BHC against white grub; ratoon stunting disease [see abstract 2347 below]; varietal yield deterioration; Q.57 promising for N. Queensland; varietal trials.

2314. ANON.  
The production of sugarcane seedlings.  
*Sugar J.*, 1952, 15 (6): 40-1.

The following hybridization techniques are summarized: (1) The Java method; (2) the Hawaiian or SO<sub>2</sub> method; (3) the Indian technique; (4) mass pollination in Florida; (5) the lantern technique in Mauritius; and (6) the South African greenhouse technique.

2315. FORS, A. L.  
Further notes on "Pepe Cuca" cane. Comparisons with Co. varieties.  
*S. Afr. Sugar J.*, 1952, 36: 701-13, bibl. 4, illus.

Although the origin of the Cuban variety Pepe Cuca was obscure [see *H.A.*, 22: 4425], it now appears that it resulted from a cross between P.O.J.2878 and Co.281 in 1935. Its performance as regards germination, arrowing, maturity index and yield characteristics is here compared with those of Co.281 as standard and the newly introduced canes Co.301 and Co.331. In general it has shown itself to germinate and ratoon well, to be drought resistant, fairly adaptable though adversely affected by excessive soil alkalinity, apparently highly resistant to mosaic but susceptible to pineapple disease, and not to be free arrowing.

2316. DUTT, N. L.  
The present cane varietal position in India. Abridged report.  
*Agric. Anim. Husb. U.P.*, 1950/51, 1 (7/8): 30-6, illus. [received Dec. 1952].

The areas planted to the principal varieties of cane in Uttar Pradesh and Bihar in 1948-49 are indicated, the total acreage in these 2 provinces being 2½ million out of a total of 3·67 million in India as a whole. The increasing use of improved varieties is discussed and short descriptions are given of some of the newer Coimbatore varieties. The node and leaf sheath characters of 4 of these, Co.464, Co.453, Co.527 and Co.S.222, are well illustrated by line drawings.

2317. DEOMANO, F. V.  
Milling performance of the sugar cane variety PSA-96 in Pampanga Sugar Mills.  
*Sugar News*, 1952, 28: 398-400.



PSA-96, a self-seedling of POJ.2878 produced in 1930-31, was originally propagated for commercial planting without proper trial and is now widely grown in the Del Carmen district. It is, however, a poor variety, being high in fibre and low in juice.

2318. CALMA, V. C., AND JUBAN, J. M.

**The ratoon crop of four promising seedling canes produced by the College of Agriculture.**  
*Sugar News*, 1952, 28: 407-8.

After plant and ratoon trials of Seedlings 46, 71, 93 and 137 against the standard POJ.2878, Seedling 93, which had a higher yield of millable stalks and higher apparent purity and sucrose content of the juice, is recommended for multiplication and commercial trial.

2319. SANTOS, J. B.

**Comparative yields between H 37-1933 (Hawaiian) and POJ 2878 (Java) in the district of Bais, crop 1951-52.**  
*Sugar News*, 1952, 28: 417-18.

The recently introduced Hawaiian variety H37-1933 in its second season of trial yielded 93 tons of cane and 161 piculs of sugar per ha. (over 1,800 ha.) compared with 67 and 110 respectively for the standard variety POJ.2878. It was more resistant to high winds.

2320. BRETT, P. G. C.

**Further progress in sugarcane breeding in Natal.**  
*Proc. 26th annu. Congr. S. Afr. Sugar Tech.*, 1952, pp. 116-23, bibl. 2.

The considerable progress made in recent years in the breeding of sugar cane in Natal is described, details of the crosses made being tabulated. Over 32,000 seedlings have been planted in the field during the past 3 years. Recent work has shown that pollen fertility in the field is limited only by low night temperatures. An improvement in the method of obtaining fertile pollen by placing detached shoots in a glasshouse resulted from moving them outside during the daytime.

2321. DU TOIT, J. L.

**Annual summary of agricultural data for the sugarcane crop 1950-1951.**  
*Proc. 26th annu. Congr. S. Afr. Sugar Tech.*, 1952, pp. 32-9.

Detailed information is provided on the yields of varieties as plant canes and first to fourth and older ratoons and on annual yields of cane by districts from 1938 onwards. The newer varieties Co.331 and particularly N: Co.310 have shown a marked superiority in average yields compared with the older standard canes Co.281 and Co.301, and their popularity is reflected in recent plantings.

2322. CLEMENTS, H. F., SHIGEURA, G., AND AKAMINE, E. K.

**Factors affecting the growth of sugar cane.**  
*Tech. Bull. Hawaii agric. Exp. Stat.* 18, 1952, pp. 90, bibl. 31, illus.

1. This paper presents an analysis of sugar cane growth in relation to morphology, physiology, and climate.  
2. The growth mechanism of sugar cane is analysed.  
(a) Growth of leaf blades begins at the meristem of the stem and continues until that particular leaf emerges from the spindle cluster to become leaf No. 1. In some cases leaf No. 2 still shows some growth. (b) After the

blade has about completed its growth, the sheath associated with it becomes active and grows rapidly. By the time a particular sheath becomes leaf No. 3, its growth is practically completed. (c) At this time, the internode of leaf No. 3 becomes active and very nearly completes its growth by the time it becomes internode of leaf No. 5 or 6. Growth measurements when made from the ground level to the top of the topmost visible brown mark at the top of the sheath are shown to represent true stem elongation except for small seasonal differences in the length of sheath. (d) Increase in circumference of the stem begins at the tip of the meristem and continues downward at least through internode of leaf No. 7. (e) Cane roots are shown to extend more than 6 feet into the soil and are shown to persist for a whole crop cycle and more. Root activity as determined by soil water absorption is practically as active in the second 18-inch layer of soil as in the first.  
3. Data are presented which were collected during the period from April 1943 to October 1947 from four concurrent plant and ratoon crops of sugar cane, variety 32-8560. (a) The ecological data include maximum and minimum temperature, light intensity and duration, humidity, wind velocity, soil temperature, and soil moisture. (b) Physiological data include tissue moisture, nitrogen, potassium, phosphorus, calcium, magnesium, and total sugars. (c) Growth measurements include rate of leaf emergence, as well as stem elongation, green weight of the sheaths, and growth units.

4. The simple relationships between various factors are developed. (a) The relations between soil moisture and tissue moisture and between soil moisture and plant growth are shown to be strong and non-linear with growth and tissue moisture, dropping sharply after about two-thirds of the available soil moisture is used up. (b) The relation between maximum temperature and growth is strongly positive and substantially linear for the range of temperature experienced, although some evidence is presented showing the possibility of temperature becoming excessive. (c) The relation between sheath moisture and growth is strongly positive and essentially linear. (d) The relation between age and growth is negative and non-linear. The height of the plant, of course, is strongly correlated with its age and probably is a better factor than age to use. (e) The relation between growth and minimum temperatures experienced is positive and linear. (f) The relation between radiation and growth is positive and linear.

5. The interrelationships existing among these several factors are worked out using the statistical method of multiple regression. Partial regressions are determined for several factors on growth units, primary index, rate of elongation, the rate of leaf emergence, the green weight of the sheaths, sheath moisture, and leaf nitrogen.

6. Three growth equations relating several factors to growth of sugar cane are developed.

7. When one of the equations is used to determine the production potential of each of several areas in the Islands, it is demonstrated that climate and physiology are dominant in reconciling yields of the areas.

8. When the growth equations are used to predict yields on many fields at Ewa Plantation Company for three crops, the predictions show a highly significant correlation with actual yields, indicating the sensitivity

of the equation to different fields under a common climate.

9. Field factors to be used to translate calculated growth units to tons of cane per acre are developed so that predictions of actual yields can be made with fair accuracy. [Authors' summary.]

2323. MUZIK, T. J., AND LA RUE, C. D.  
The grafting of large monocotyledonous plants.

*Science*, 1952, 116: 589-91, bibl. 7, illus.

A technique of grafting sugar cane, *Bambusa longispiculata* and other monocotyledons is described. The firmly grasped shoot is broken with a jerk which causes a rupture in the intercalary region. The same stem may then be replaced, or a stem of the same size from another plant of the same species is inserted. An exact fit is very important, but trimming the edges of the graft proved deleterious. In most of the plants tested, the leaf sheath served to support the graft. It was advantageous to tie the grafts firmly to ensure even, continuous contact. Best results were obtained with young vigorous material. On the average about 3% of the grafts were successful. Although the technique will hardly acquire practical importance until a higher percentage of take can be achieved, it is thought to be useful for certain types of investigation.—Federal Exp. Stat. Mayagüez, Puerto Rico and Univ. of Michigan.

2324. SINGH, S. B.  
A new and lucrative rotation for sugarcane.  
*Agric. Anim. Husb. U.P.*, 1951, 1 (12): 3-5, illus. [received Dec. 1952].

Sugar cane is considered to exhaust soil fertility more rapidly than most other crops in Uttar Pradesh. A new rotation which has given good results on small holdings in well-drained light soils is groundnut—arbar (pigeon pea)—cane. The 2 legumes are sown together when the monsoon breaks, the pigeon peas being set in rows 9 ft. apart. After harvesting the groundnuts in November, 3 trenches, 3 ft. apart, are made in the rows between the pigeon peas, manure is applied, and cane planted in the trenches in February one month before the pigeon peas are harvested. Cane grown in this way has usually yielded 25 to 36 tons per acre compared with an average of 12 to 14 tons for the area.

2325. RAHEJA, P. C.  
Recent physiological investigations on drought resistance in crop plants.  
*Indian J. agric. Sci.*, 1951 (issued 1952), 21: 335-46, bibl. 45.

After a short review of work done during the first half of this century on various aspects of drought resistance a description is given of recent Indian studies on the metabolism of cotton and sugar cane in relation to drought resistance.

2326. KUMAR, K., AND SRIVASTAVA, J. P.  
Tolerance of different crop and vegetable seeds of various reactions of H-ion concentrations.  
*Indian J. agric. Sci.*, 1951, 21: 39-44, bibl. 7 [received Dec. 1952].

Seeds of various crops, mostly cereals and pulses, and setts of sugar cane were germinated in solutions with pH values ranging from 4 to 10 inclusive. Sugar cane setts of Co.312 showed germination of over 84% within

the range pH 5 to pH 8 inclusive, the highest germination, 93.75%, occurring at pH 8. Germination dropped to about 72% at pH 9 and to 66% at pH 10.

2327. RAHEJA, P. C.  
Analysis of sugarcane yields. III. Inter-relationship of varieties, nitrogen, phosphate and potash. IV. Varieties × periods of planting × irrigation interval experiment.  
*Indian J. agric. Sci.*, 1951 (issued 1952), 21: 313-24, bibl. 18, and 325-34, bibl. 13.

1. Details are given of experiments undertaken at the Tarnab Agricultural Research Station in Peshawar Valley from 1941-42 to 1946-47 with the object of determining the quantitative balance amongst the major nutrients. A multiple-factor experiment of  $2 \times (3)^3$  design consisting of two varieties (Co.312 and Co.290), three levels of nitrogen (nil, 50 lb. and 100 lb. N per acre), phosphate (nil,  $37\frac{1}{2}$  lb. and 75 lb.  $P_2O_5$  per acre) and potash (nil,  $37\frac{1}{2}$  lb. and 75 lb.  $K_2O$  per acre) was conducted for four seasons. Later an NPK experiment of  $(3)^3$  design was run for two seasons. The data obtained over those six years have indicated that (1) The environment influenced the cane yield, quality of crop and sugar yield in the various years. Varieties responded differentially to the environment. (2) On the whole nitrogen showed a beneficial response in growth of the crop rather than accumulation of sugar, so that crop yield improved with increasing doses of nitrogen, but C.C.S. % value was lowered. Generally the actual sugar yield was higher with 50 lb. than with 0 or 100 lb. N. The environment influenced markedly the sugar yield with 100 lb. N. Application of P at two levels had little effect on crop growth or sucrose content. (3) K did not improve the cane yield, and tended to depress sugar contents. (4) The experiment does not suggest a fixed ratio of N: P: K for a fertilizer mixture for high sugar yield, but there is evidence that with higher N the application of P is likely to prove beneficial.

2. A complex experiment combining varieties (as above), periods of planting (November, March), and irrigation interval treatments (weekly, critical stage of soil moisture) was conducted over 5 years. Results indicated that: (1) With November planting germination occurs to a limited extent up to the end of February, owing to sub-optimal temperatures. March planting gave better results. (2) The cumulative length growth of autumn planted cane was less than in the March crop, the variety Co.312 suffering more than Co.290. (3) In cane and sugar yields the differences between November and March plantings were not significant. (4) Co.312 significantly outyielded Co.290 in cane and sugar. The interaction between varieties and periods of planting was not significant. Mean sugar yields showed less difference between November and March plantings in Co.290 than in Co.312, the differences being 0.8 mg. and 3.2 mg. respectively. (5) Weekly irrigation gave significantly higher cane yields than applying water when the critical stage of soil moisture was reached, but differences in sugar yield were not significant. There was no interaction between varieties and irrigation intervals.

2328. SAMUELS, G.  
Sugarcane and soil fertility.  
*Sugar J.*, 1952, 15 (7): 16, 19-20, bibl. 3.

Data from Puerto Rico indicate that provided cane is



well fertilized and all plant residues are returned to the soil a good equilibrium of soil organic matter is maintained in many situations and the physical condition of the soil is preserved or improved. A 40 ton crop of cane removes about 39 lb. N, 66 lb.  $P_2O_5$  and 110 lb.  $K_2O$  but leaves behind in the trash 144 lb. N, 155 lb.  $P_2O_5$  and 597 lb.  $K_2O$ . N is the major limiting factor. Under Puerto Rican conditions the need for K is greater than that of P.

2329. SAMUELS, G., AND LANDRAU, P., JR.  
The response of sugarcane to fertilizers.  
I. The Arecibo cycle, 1944-1950.  
*J. Agric. Univ. Puerto Rico*, 1952, 36:  
203-29, bibl. 7.

Detailed results are given of an experiment conducted by the Río Piedras Agricultural Experiment Station to test the effect of different levels of N, P and K on the leading sugar cane varieties. It was laid down at Arecibo in 1944 and was carried on for a plant cane and 4 ratoons. The 7 fertilizer treatments in lb. per acre of N,  $P_2O_5$  and  $K_2O$  were 0-300-300, 125-300-300, 250-0-300, 250-150-300, 250-300-0, 250-300-150 and 250-300-300. The major results were: (1) N gave the highest yield increases in cwt. of 96° available sugar per acre. (2) P did not increase sugar yields. (3) K did increase sugar yields. (4) N and P did not influence sucrose concentration. The omission of K decreased it significantly. (5) P.R.903 gave the highest yields of sugar per acre as compared with P.O.J.2878, M.275, and M.317. The yields of M.317 and P.O.J.2878 were about equal, and M.275 gave the lowest. (6) The varieties maintained their relative yielding power when tested at various fertilizer levels. Except for the no-fertilizer level, P.R.903 maintained its significant lead in yield at all levels. There was no significant interaction between varieties and fertilizers. (7) The reductions in yield due to the omission of a fertilizer element for the mean of five crops were 33, 3, and 9% for N, P, and K, respectively. (8) Analysis of leaf samples revealed that corrections must be made for rainfall to prevent a yearly variation in the data. When corrected, values of 1.40% N (dry weight of the leaf) or below were associated with low cane yields, and values of 1.60% or over with high yields. For P, values above 0.17% at a cane age of 3 months may be regarded as indicating no appreciable need for P. K values of 1.70% or less indicate a need for K, and 1.90% or greater, none.

2330. SAMUELS, G., LANDRAU, P., JR., AND CAPÓ, B. G.  
The response of sugarcane in Puerto Rico to various nitrogen sources.  
*J. Agric. Univ. Puerto Rico*, 1952, 36: 230-9, bibl. 6.

1. A survey of the literature of earlier fertilizer trials in Puerto Rico in which the efficiency of ammonium sulphate, sodium nitrate, tankage, and calcium cyanamide were compared revealed that there was no significant difference in the yield response to these N carriers. 2. Experiments were conducted in which ammonium sulphate and ammonium nitrate were compared as N sources. The results at Río Piedras and Guánica showed no significant differences in yield of cane or sugar regardless of which was used. At Isabela there was a better response to ammonium sulphate than to ammonium nitrate in the first ratoon, but it was

significant only at the 5% point. 3. Uramon and cyanamide when tested along with the ammonium sulphate and nitrate experiments at Río Piedras and Isabela, produced no significant responses as compared with the other N sources. At Río Piedras liquid ammonium nitrate produced the lowest yield of any N source used. 4. Ammonium sulphate is the chief N source used in Puerto Rico. Its use is chiefly dictated by economic and manufacturing conditions. Ammonium nitrate, which is cheaper per unit of N, cannot be used at present because of extremely high transport costs based on its explosiveness. [From authors' summary.]

2331. SAMUELS, G., LUGO-LÓPEZ, M. A., AND LANDRAU, P., JR.  
Factors affecting the sucrose content of sugarcane: fertilizers.  
*J. Agric. Univ. Puerto Rico*, 1952, 36:  
194-202, bibl. 9.

Data are presented on the influence of fertilizer on the sucrose content of sugar cane in Puerto Rico. The results of over 150 field experiments conducted by the Río Piedras Experiment Station over a period of 15 years and covering a wide range of varieties and soils showed that P, K, Cu, Mg, Zn, B, Mn, Ca, Na, Fe and S have no significant effect. N, however, produces an increase in sucrose content with increased cane yields. The increase in sucrose content becomes significant only after the increase in yield of cane exceeds 27%.

2332. MARTÍNEZ, M. B., AND LUGO-LÓPEZ, M. A.  
The influence of subsoil fertilization on sugarcane yields.  
*Sugar J.*, 1952, 15 (7): 24-7, bibl. 8.

In continuation of experiments on the effects of subsoiling and sub-soil fertilizing of sugar cane [see *H.A.*, 22: 3117 and 23: 1327] a plant cane trial is described in which the application of half a total dressing of 2,000 lb. 13-3-12 fertilizer to the subsoil gave significantly higher cane yields than when all the fertilizer was applied on the surface. There were no significant differences in mean sucrose contents, and the sub-soil fertilizer application produced an average increase of 16% in yield of sugar.

2333. LANDRAU, P., JR., AND SAMUELS, G.  
The handling of sugarcane trash. I. Yield and economic considerations.  
LUGO-LÓPEZ, M. A., LANDRAU, P., JR., AND SAMUELS, G.  
The handling of sugarcane trash. II. Effects of various practices on soil properties.  
*J. Agric. Univ. Puerto Rico*, 1952, 36: 240-5, bibl. 6, and 246-54, bibl. 11.

Experiments to determine the effects on sugar cane yield of different methods of handling trash were begun at Río Piedras in 1944 with P.O.J.2878 (20 replications) and at Isabela in 1946 with P.R.905 (9 replications). Five treatments were applied: (1) trash burned after spreading evenly over the plot; (2) trash aligned in alternate banks or rows; (3) trash aligned as in (2) and a shallow furrow ploughed in the cleared banks; (4) trash buried in furrows about 1 foot deep between the rows; and (5) trash left untouched as found after harvesting. At Río Piedras there was no difference in yield attributable to the treatments until the 5th and 6th ratoon; in these trash-aligned-without-ploughing

gave a significantly higher yield than trash-burned or trash-buried, between which there was no significant difference. At Isabela no significant differences were obtained between the 4 treatments applied—(1), (2), (3) and (5)—for 4 crops of a plant cane, 2 ratoons and a plant cane. In general, weeding costs were higher when trash was burned or buried than when it was aligned or untouched. It is recommended that trash should be aligned.

At Río Piedras the mean organic matter content of the soil under trash-burned was significantly lower than under trash-buried or aligned, and the C/N ratio was significantly lower under trash-burned than under trash-buried. None of several other tests and measurements performed showed any significant differences. [Partly covered, *H.A.*, 23: 1338.]

2334. PEARSON, C. H. O.

**Progress report on the field experiments dealing with the treatment of trash and fertilizer applications.**

*Proc. 26th annu. Congr. S. Afr. Sugar Tech.*, 1952, pp. 124-9.

The results to date are summarized of 6 trials involving comparisons between burning trash and leaving trash, as a blanket or in lines, and between different levels of N and P. In general the results indicate that trashing should be practised, that lining may be preferable to blanketing especially when cane is cut early in the season, and that fertilizer should be used in conjunction with trash, the greatest response to this combined treatment coming in the second or third ratoon.

2335. PEARSON, C. H. O.

**Trash blanketing plant cane.**

*S. Afr. Sugar J.*, 1952, 36: 785-7.

A trash blanket was successfully maintained for plant cane at the Experiment Station, Mount Edgecombe, by first parting the trash to expose old cane stools and breaking these up with a rotary hoe and then re-aligning the trash over the rows and breaking up the inter-row spaces with the rotary hoe. The inter-row spaces were then furrowed, the tracks of the tractor travelling on the top of the trash rows and compressing them. Cane setts planted in the furrows germinated more rapidly than setts planted in plots ploughed and harrowed in the usual way. The experiment is continuing.

2336. WALKER, H., AND GLICK, G. B.

**Determination of the potash in cane juices as an indication of the fertilizer requirements of the soil.**

*Sugar News*, 1952, 28: 335-7.

The K content of cane juice can be used as an aid to determining the K requirements of the soil. In 2 experiments, in which it was determined by a modification of Sherill's centrifugal method, a content of less than 0.05% K<sub>2</sub>O indicated the need for K fertilizer and one of 0.10% did not. It is not known whether these figures are generally applicable. The reagents and apparatus used and the results of the experiments are given.

2337. LOCSIN, C. L.

**Fertilizer test: No-potash vs. potash.**

*Sugar News*, 1952, 28: 149-53.

The crop log and harvesting results are given of a trial

which was conducted in 1951 with cane on a clay soil with a distinctly low K content in Victorias. The plot treated with 200 kg./ha. of muriate of potash yielded 75.726 tons/ha. compared with 73.379 for the untreated plot.

2338. LOCSIN, C. L.

**Field experiment No. 98 (52) on quantities of potash fertilizer.**

*Sugar News*, 1952, 28: 466-9.

Four K fertilizer treatments, 0, 100, 200 and 300 kg./ha. of muriate of potash, were given in an experiment at Victorias in the Philippines in 1951-52 to a ratoon crop of H37-1933 growing on a gravelly clay loam. The crop was harvested at 12 months. In addition all plots received 120 kg./ha. each of N and P<sub>2</sub>O<sub>5</sub>, and the area had previously been treated with 4 tons/ha. of agricultural lime. The yields were 104, 114, 122 and 124 piculs of sugar per ha. respectively. The greatest profit per ha., from 18 piculs/ha. increase in sugar yield, over no K, was given by 200 kg./ha. of K muriate. The small further increase by the largest application did not cover the extra cost.

2339. DU TORR, J. L.

**Foliar diagnosis or leaf analysis.**

*S. Afr. Sugar J.*, 1952, 36: 613-17.

Following a general discussion of the use of foliar diagnosis in Mauritius and Jamaica and of crop logging in Hawaii, the author considers the application of foliar diagnosis to Natal. Preliminary leaf analyses have revealed deficiencies, excesses and normal concentrations of the major plant nutrients on nearly all soil types. N deficiency is widespread and cases of K deficiency are also common; P is very low in some virgin soils but is often high in older cane fields. N and P alter with the age of the crop, but K tends to be more variable, showing two seasonal peaks. There are also varietal differences in leaf composition. Further experimental work should be done in conjunction with fertilizer and variety trials.

2340. MELLO MORAES, J., AND OTHERS.

**Influência do cloro, sobre a composição do caldo da cana de açúcar Co 290, aplicado no solo, na forma de cloreto de sódio. (The effect of chlorine applied to the soil as sodium chloride on the juice of the sugar cane variety Co.290.)**

*An. Esc. sup. Agric. "Luiz de Queiroz" Piracicaba*, 1951, 8: 115-51, bibl. 29 [received 1953].

An experiment was conducted on sandy soil in the Piracicaba area in 1945-47 to study the effect of soil applications of sodium chloride on Co.290. A 5×5 Latin square layout was used, each plot being 50 sq. m. Chloride was applied at 4 rates varying from 544 to 4,352 g. per plot, the latter figure being equivalent to 656 kg. per ha. The doses were given in 4 portions, the first dug in in January 1945 and the other 3 superficially in January 1946, October 1946 and March 1947. All treated plots and the untreated control received a standard NPK dressing. Full details and a statistical analysis of the results are given. In the doses given, sodium chloride had no effect on the yield or juice of Co.290.



2341. LUGO-LÓPEZ, M. A., AND GRANT, R.  
Preharvest foliage sprays of sugarcane with 2,4-D.  
*J. Agric. Univ. Puerto Rico*, 1952, 36: 187-93, bibl. 4, illus.

Data are presented here on the effect of applications to sugar cane of 10, 20 and 30 lb. to the acre of the sodium salt of 2,4-D, acid basis, at three intervals (10, 20 and 30 days) prior to harvest. Field experiments were conducted at Humacao and Río Piedras following a randomized block layout. Each treatment was replicated six times. The effect of the treatments on the final sucrose content of the cane was unimportant. The mean available 96° sugar % cane was 12.2 at both locations with very small deviations above or below it. No significant differences were observed between the mean Brix, polarization, purity, available 96° sugar % cane, and tons of cane to the acre at either location. [Authors' summary.]

2342. BOURNE, B. A., AND HUNDERTMARK, B. W.  
A note on some effects of chlorophenyl dimethyl urea on sugar cane, with special reference to flowering.  
*Sugar J.*, 1952, 15 (7): 28, 33, 40, illus.

In the course of a weed control trial in Florida on the cane variety Cl.41-142 it was observed that cane in plots treated with 8 and 16 lb. CMU per acre was stunted. Analyses did not suggest that there were appreciable differences in sugar percentages on 2 dates in treated and control plots but that yields per acre of both cane and sugar were reduced by CMU. Inflorescence production in the treated plots was greatly depressed. It remains to be seen if similar results would occur under other conditions of soil, climate or variety.

2343. ARCENEAUX, G., HERBERT, L. P., AND MAYEUX, L. C., JR.  
Effects of breakage on plant development and field production with sugarcane.  
*Tech. Bull. U.S. Dep. Agric.* 1059, 1952, pp. 15, illus., from abstr. in *Biol. Abstr.*, 1953, 27, No. 4561.

In controlled field experiments breakage of stalks of sugar cane, as in hurricane damage, lowered the yield and mill quality of cane and caused a % reduction in yield of sugar per acre averaging approximately half the % breakage. The yield decreased with an increase in breakage. Broken stalks were abnormally low in fibre content and gave an average indicated yield of sugar per ton of cane approximately 50 lb. under that obtained from unbroken stalks. The Brix (total solids) and % of sucrose in the juice from unbroken stalks decreased significantly as the % of breakage increased within a stool, but the purity was not affected by variations in rate of breakage. The tendency of both broken and unbroken stalks to develop axillary growth increased consistently as % of breakage increased, thus indicating a gradual breakdown *en masse* of the mechanism controlling apical dominance. [Abstract by senior author.]

2344. ABBOT, E. V., AND MARTIN, J. P.  
The sugarcane disease situation in Peru.  
*Plant Dis. Repr.*, 1952, 36: 387-8.

A survey of sugar cane diseases in Peru, with special reference to a new disease now known as sclerospora

disease, was made in July 1952. P.O.J.2878 is the principal variety, covering about 90% of the acreage. The remaining 10% consists mostly of two Hawaiian canes, H.32-8560 and H.37-1933. The symptoms of the sclerospora disease are severe stunting and usually excessive tillering at ground level. The leaves become thickened, remain erect, and show mottling rather like mosaic disease. Affected plants produce little or no millable cane. Control measures recommended include roguing and destroying diseased plants, selection of disease-free planting material, maintaining optimum drainage conditions, and planting resistant varieties. P.O.J.2878 is resistant to sclerospora disease. H.32-8560 is susceptible, and H.37-1933 is intermediate. Other sugar cane diseases observed during the survey are mentioned.

2345. DALE, W. T.  
A review of the position with regard to sugar-cane leaf scald in British Guiana.  
*Trop. Agriculture Trin.*, 1952, 29: 9-11, bibl. 9, illus.

Notes are given on the identity of the disease, its symptoms, varietal susceptibility and crop sanitation measures [see also next abstract]. The main points of an experimental programme which has been started are: (1) studies on the identity of the causal bacterium; (2) method of dissemination and entry into host; (3) effect of leaf scald on yield and juice quality; (4) varietal resistance tests.

2346. ROBERTSON, J. S.  
"Leaf scald" investigation.  
*Sugar Bull. Brit. Guiana Dep. Agric.* 20, 1952, pp. 53-7.

A survey in 1951 showed that the disease is widespread in all cane areas. The natural means of spread are not known. The chief artificial means are by knife infection and the planting of diseased cane. Common susceptible varieties are B.34104, D.14/34, and D.142/41. The commercially most promising of the newer varieties—B.37161, B.4098 (the most resistant but very susceptible to the sugar cane moth borer), B.41227, B.4362 and D.621/43—show greater resistance than those now in cultivation. Control measures being conducted by estates are: (1) regular survey of fields; (2) roguing before collection of planting material by applying  $\frac{1}{8}$  pt. diesel oil into the spindle and around the base of the cane (which results in complete destruction in 14-21 days); (3) sterilization of knives at planting time (trials in progress); and (4) sterilization of knives at harvest. Outbreaks which have occurred on B.41227 despite control measures are probably due to this variety carrying latent infection. In 2 experiments to assess losses due to leaf scald there were reductions in weight of 17.2 and 37% respectively in diseased canes compared with healthy ones.

2347. MUNGOMERY, R. W.  
Ratoon stunting disease.  
*A.R. Bur. Sugar Exp. Stats*, 1951/52, Brisbane, 1952, p. 43.

The disease has been found to be widespread and is now regarded as a major pathological problem. Believed since its discovery in 1945 to be a new disease, it now seems likely to have been present for many years and it may be the cause of the marked yield drop from plant to ratoon crops. Orange-red discoloration of the

vascular bundles in the nodal tissues has been found to be a fairly accurate indication of the disease in a number of varieties. Crops grown from diseased setts of Q.28 have remained healthy for 3 years after the following treatments: (1) in hot water at 52° C. for 1 or 1½ hours, or at 54° C. for 1 or 1½ hours; (2) in a hot air oven at 50° C. for 24 hours, or at 54° C. for 8 hours.

2348. SHARMA, S. L.

**Pathogenicity of *Puccinia kuehnii* (Krueg)**

**Butler on sugarcane in Bihar.**

*Curr. Sci.*, 1952, 21: 288, bibl. 2.

Attempts to infect Co.453, Co.475, Co.513, B.O. (Bihar and Orissa) 10 and B.O.11 with the form of rust, *P. kuehnii*, commonly occurring on *Erianthus arundinaceus* were unsuccessful.

2349. LUKE, H. H.

**Fungi isolated from sugarcane soils of Louisiana and their antagonistic effect on *Pythium arrhenomanes*.**

Abstr. in *Phytopathology*, 1952, 42: 469.

Louisiana sugar cane soils include 4 major types. These soils were sampled at 3-month intervals for a period of 1 year, and fungal populations, pH values, and moisture percentages were determined. A total of 5,218 fungal isolates (approximately 100 from each soil sample) were tested for antagonism to *Pythium arrhenomanes*, the causal agent of sugar cane root rot. Approximately 17% of the isolates tested were antagonistic to this pathogen in agar cultures. The antibiotic value (the average distance of inhibition in millimetres × number of thousands of fungi per g. of soil) was used as a measure of the antibiotic activity of the fungi in these soils. A correlation was found between soil type and antibiotic value. Antibiotic values were higher in heavy clay soils than in light sandy soils. However, root rot was not prevalent in sandy soils but was severe in heavy clay soils.

2350. WILLIAMS, J. R.

**Pests of sugar cane.**

*A.R. Mauritius Dep. Agric.* 1951, 1952, pp. 59-60.

*Sugar cane white grub, Clemora smithi*: Tests begun in 1947 have shown that benzene hexachloride is not a practical proposition against this pest though it does reduce infestation. The data emphasize the known ability of the important cane M.134/32 to overcome the grub injury. When the standard of cultivation practice is good the grub apparently causes no loss in yield unless infestation is very high. *Quarantined sugar cane*: Pestox 3 is used in the quarantine greenhouse at 3 and 6 c.c. of the 60% anhydride (or equivalent doses of other formulations) per drum of cane after the canes have germinated and the foliage is at least 2 ft. high. This renders the juice toxic to *Aphis sacchari* for apparently the whole duration of the cane generation (about 10 months).

2351. GUPTA, B. D., AND NAGAR, D. S.

**A note on the effect of white-fly (*Aleurolobus barodensis*) Mask. infestation on the quality and yield of plant and ratoon crops of sugarcane.**

*Agric. Anim. Husb. U.P.*, 1951, 1 (11): 27-32, bibl. 1 [received Dec. 1952].

As part of a long-term experiment on the ratooning of sugar cane in Aligarh, U.P., detailed records were kept of white-fly infestations on a plant and 3 ratoon crops in each of 3 or more years. Plant canes showed significantly lower infestations than ratoons. Samples of infested cane were generally shorter in length and lighter in weight than healthy samples. The juice from infested canes showed lower sucrose and purity values than that from healthy canes. Applying 100 lb. N per acre to each ratoon crop markedly reduced the decline in yields of cane with each successive crop as compared with unmanured ratoons and also reduced the incidence of white fly.

2352. GUPTA, B. D., AND SINGH, K. G.

**Biology of the sugarcane stem borer, *Diatraea auricilia* Ddgn., in the Uttar Pradesh.**

*Agric. Anim. Husb. U.P.*, 1951, 2 (4): 12-20, bibl. 6, illus. [received Dec. 1952].

The life cycle of the *D. auricilia* was investigated and is described. After cane harvest the borer breeds in late shoots left unharvested, there being apparently no alternate host plants. Infestation increases when cane is lodged or waterlogged, and earthing up during July-August and improved drainage are suggested as means of reducing attacks. The average loss in yield through borer damage was estimated at 17%, and quality and sucrose recovery were also adversely affected.

2353. DE ALMEIDA, J. R.

**Canas passadas. (Over-mature cane.)**

*Rev. Agric. Piracicaba*, 1952, 27: 361-3.

In over-mature canes the reducing sugar content becomes higher, there is a reduction in sucrose, in juice purity and in pH, and the distribution of sucrose changes. There is less sucrose in the basal internodes, a rapid increase in the median internodes, a tendency towards increase in the apical internodes and a variable percentage elsewhere. The results are presented of a detailed study of the juice of 7 P.O.J. varieties at 18, 20, 22, and 24 months old and of the cane and juice of Co.281 at 26 months old.

2354. CHRISTIANSON, W. O.

**Cane testing, with particular reference to the use of the Java ratio in Natal.**

*Proc. 26th annu. Congr. S. Afr. Sugar Tech.*, 1952, pp. 69-84, bibl. 6.

The properties of the cane associated with Java ratio [the basis on which cane payments are made in the South African sugar industry] are, first, and most important, fibre per cent. cane, whether this be due to trash or to the fibre of the stalk itself; other factors are the state of maturity of the cane and disease conditions, including those due to long delay between cutting or burning and crushing. Fibre content, when high, leads to low Java ratios, while a low fibre percentage causes a high Java ratio. Unripe cane has a higher Java ratio than has mature cane, and disease conditions lead usually to a lowering of Java ratio. Only a spurious correlation between Java ratio and sucrose % cane has been found. Variation between milling plants in the preparation of the cane for crushing by knives, or in the pressure applied by the crushers, have negligible or no practical effect on Java ratio, but the cleanliness



of the milling plant is of the utmost importance.  
[Author's conclusions.]

2355. BALCH, R. T., SMITH, B. A., AND MARTIN, L. F.

Note on the starch content of Louisiana sugarcane and raw sugar.

*Sugar J.*, 1952, 15 (6): 39-40, bibl. 7.

Samples of 4 C.P. cane varieties showed starch contents ranging from 0.0003% to 0.0063% which are too low to account for the presence of 0.012% to 0.018% starch in raw sugar from 3 factories. The nature of the coagulable nitrogen constituents as well as the starch and starch-like substances in cane require further investigation by modern analytical techniques. [See also next abstract.]

2356. BALCH, R. T.

Further notes on starch in Louisiana canes, juices and raw sugars.

*Sugar J.*, 1953, 15 (8): 11-12, 14-15, bibl. 6.

Starch was present in each of 41 pre-harvest samples of cane, representing 12 varieties, examined in 1949. It was usually deposited in a restricted area at each sound node and the sizes and areas of these deposits are indicated. In 1951, each of 26 samples of milled juice from 9 varieties contained starch. In 6 samples of juice from sound cane the starch content varied from 1.15 mg. to 13.3 mg. per ml. of whole mill juice. Cane injured by freezing contained less starch than sound cane of the same variety and source. Starch contents found in raw sugar ranged from 12.2-24.4 mg./100 g. in the first week's production to 2.5-5.4 mg./100 g. in the last week's production.

#### Tea.

(See also 2368k, 2387.)

2357. GAMBLE, G.

Report on visits to India, Malaya and Ceylon with some notes for the guidance of tea planters in Kenya.

[Publ.] *Kenya Dep. Agric.*, 1951, pp. 94, illus., 7s. 6d.

EDEN, T.

The culture of the tea bush. A review of some varying systems.

*World Crops*, 1952, 4: 371-3, illus.

Part I of Gamble's report consists of notes on planting in Assam, Darjeeling, Malaya and Ceylon; Part II is a guide to planters in Kenya and contains sections on sites, seed, nursery, preparation of land, planting, shading, pruning, plucking, cultivation, manuring, fuel reserves, vegetative propagation and African-grown tea; Part III deals with manufacture.

In his review of the report Eden puts forward his own thesis that no one tea-growing area can claim universality for its opinions and practices and supports this by examining the important diversifications in practice met with in Assam, Ceylon and East Africa in the techniques of planting, pruning and plucking.

2358. LAYCOCK, D. H.

An experiment with sizes and weights of tea seed.

*Nyasaland agric. quart. J.*, 1951 (issued Nov. 1952), 10: 134-8, reprinted in *Plant. Chron.*, 1953, 48: 35-7.

In an experiment to test the hypothesis that tea seeds with large food reserves (the larger, heavier seeds) should give better seedlings than those with small reserves, seed was divided into 8 groups by riddling and by the rate of sinking in water (immediately, within 2 hours, between 2 and 24 hours, still floating after 24 hours). The hypothesis was proven. Big sinkers gave a significantly greater proportion of useful plants than big 24-hour sinkers, and than any small sinker group. No significant differences existed between any small-seed group. Size and weight made little difference to percentage germination.

2359. SOČAVA, V. B., AND BOKUČAVA, M. A.

Some data on the growth of tea and the quality of the leaf under forest shelter.

[Russian.]

*Doklady Akad. Nauk S.S.S.R.*, 1952, 85:

1169-71.

The figures given show that under the ecological conditions of the Moldavian S.S.R., the cultivation of tea under forest shelter is more successful than in the open. In narrow clearings in woodlands the tea leaf maintains the desired quality.

2360. HAWORTH, F.

Minor element nutrition of the tea bush in Ceylon.

*Tea Quart.*, 1952, 23: 67-9, bibl. 4.

A case is mentioned in which healthy looking but low yielding tea responded markedly to 6-8 tons cattle manure per acre but gave no yield response to artificials supplying larger amounts of NPK. In order to discover whether the effect of the F.Y.M. was due to it supplying a minor element, a randomized trial was carried out in which a nutrient spray containing all known essential elements was applied at weekly intervals for 5 weeks. There was no response, nor was there any response when the experiment was repeated on 3 other sites. It is concluded that, for the present, minor element deficiencies are unlikely to be of importance in limiting yields of tea in Ceylon.

2361. D[UTTA], S. K., AND G[LOVER], P. M.

Pruning of young tea (Assam kinds).

*Serial Tocklai* 10/1, 1952, pp. 4.

Recommendations are made on pruning in the nursery and in the early years in the field. A pruning-and-plucking programme is provided. This serial replaces No. 10.

2362. HUYSMANS, C. P.

Bestrijding van blisterblight (*Exobasidium vexans*) in thee op Sumatra. (Control of blister blight (*Exobasidium vexans*) on tea in Sumatra.) [English and Indonesian summaries, 1½ pp. each.]

*Bergcultures*, 1952, 21: 419-64, bibl. 17, illus.

The results are reported of an extensive study on the development and control of blister blight. High air humidity is required for the development of the fungus. A serious attack may develop when conditions have been favourable for infection for only 1-2 days. Removal of heavy shade can considerably reduce infection, but this practice gives rise to a weed problem. Weeds grow quicker without shade, and in wet weather tall weeds can themselves encourage blister blight infection. Shade

removal also makes the bushes more likely to be weakened by plucking; advice is given on suitable plucking practices. The lower the pruning, the more danger there is of blister blight infection during recovery. Pruning just before dry periods is not recommended, but slope pruning is desirable. Tipping the primary shoots results in the development of a dense leaf mass which provides ideal conditions for infection. It is recommended that the flush buds should be removed early from all primary shoots with 4 leaves and that normal tipping should be done only on secondary shoots. Plucking infected leaves or giving a light pruning to remove diseased shoots during severe attacks are worthless as control measures. Chemical control is costly but can be completely effective. Pressure retaining knapsack sprayers were found to be the most suitable type of spraying apparatus. Dusting requires less labour and can be done with either hand or power dusters. Among the fungicides tested the copper compounds were outstandingly good. For complete control, spraying or dusting should be done every 4-5 days using the following amounts: spraying,  $\frac{1}{2}$  lb. copper oxychloride 50% in 33-44 gal. per acre; hand dusting, 15 lb. 2% copper dust per acre; power dusting, 15 lb. 4-6% copper dust per acre. The economic advantages of the various methods are compared. The value of blister-blight forecasting and the selection of resistant clones are discussed.

2363. LOOS, C. A.

**Studies in blister blight control. XI. Dusting against blister blight on Alupolla group, Ratnapura.**

*Tea Quart.*, 1952, 23: 76-80.

Under low-country conditions dusting with 5 lb. 6% Cuprosana every 5 days on tea recovering from pruning, followed by 6 lb. 4% Cuprosana every 7 days gave excellent results, comparable to those of spraying on 7 day rounds. Applications at lower concentrations or at lower rates were generally less satisfactory. The costs of dusting are given, as are Cu analyses of the leaves and comments on the use of 2 dusters, the Whirlwind and the Armada.

2364. WEBSTER, B. N.

**Infection chains and acacias.**

GORRIE, R. M., AND WORTHINGTON, T. B.  
**The identification of Australian wattles (acacias) introduced into Ceylon.**

*Tea Quart.*, 1952, 23: 70-2 and 73-5.

The first article discusses infection chains with particular reference to the part played by various hosts, including *Acacia decurrens*, in perpetuating the "Cercospora" disease of tea caused by *Calonectria theae*. The second gives brief botanical descriptions of 16 *Acacia* spp. now found in Ceylon. Infectivity trials are in progress with the object of finding resistant types for use as shade trees.

#### Other crops.

2365. FEUELL, A. J., AND OTHERS.

**Cohune nuts from British Honduras.**

*Colon. Plant Anim. Prod.*, 1952/53, 3: 51-3.

Chemical and physical determinations are reported on the kernels, shells and husks of nuts of the cohune palm,

*Attalea cohune*. The oilseed would be acceptable, the oil itself, amounting to 70.2% of the moisture-free kernels, being intermediate in character between palm oil and coconut oil, but the seed only represents about 10% of the whole nut. The shell residue after burning could be converted to charcoal and might be of interest as a source of furfural (about 17%) provided 1,000 tons or more were available annually. The husk fibres are probably too short for brush making.

2366. RAMA RAO, P. B., BALAKRISHNAN, S., AND RAJAGOPALAN, R.

**Spray drying of Indian gooseberry juice.**

*Curr. Sci.*, 1952, 21: 277, bibl. 6.

A non-sticky, fine powder has been prepared from the juice of *Embilca officinalis* by dissolving 20-25% common salt in the juice before spray drying. The powder contained 8.6 mg. vitamin C per g. salt.

#### Noted.

2367.

a AGARWAL, G. D., AND SAGAR, V.

**Cost of production of sugarcane on Government Farm, Hardoi.**

*Agric. Anim. Husb. U.P.*, 1951, 1 (11): 17-22 [received Dec. 1952].

b BONILLA G., E.

**Estudio de la distribución vertical de la humedad relativa, de la temperatura del aire y del suelo en una plantación de café. (A study of the vertical distribution of the relative humidity and of the temperature of the air and the soil in a coffee plantation.)**  
*Bol. inf. Colombia*, 1952, 3 (34): 19-37, bibl. 8.

c BOZZI, L.

**La produzione delle banane fico (Consigli agli agricoltori della Somalia). (The production of dried bananas. Advice to Somaliland farmers.)** [English summary 5 lines.] [Publ.] *Ital. Somaliland Dep. Agric.*, reprinted in *Riv. Agric. subtrop.*, 1952, 46: 285.

d BROOKSON, C. W.

**[Rubber] clone Pr.107 (L.C.510)—a critical appraisal.**

*Planter, Kuala Lumpur*, 1952, 28 (2): 54-8, from abstr. in *DocumBl. trop. Prod. Amst.*, 1952, 7: 317.

e CALLE, H.

**Los concentrados de pulpa y de mucilago del café. (Coffee pulp and mucilage concentrates.)**  
*Bol. inf. Colombia*, 1952, 3 (35): 22-30, bibl. 4.

Experiments on preserving, concentrating and processing.

f DUTTA, S.

**Some bananas of Assam.**

*Ind. J. Hort.*, 1952, 9 (1): 26-35, bibl. 4, illus.

Descriptions of 19 banana varieties.



- g FERWERDA, F. P.  
Vruchtval bij Robusta-koffie en zijn samenhang met bestuiving en bevruchting. (Fruit drop in robusta coffee and its relation to pollination and fertilization.)  
*Vakblad voor Biologen*, 1951, 31: 123-30, illus., from English abstr. in *Euphytica*, 1952, 1: 232.  
A review.
- h FORT, C. A., AND SMITH, B. A.  
Analytical studies of sugarcane juices processed on a pilot plant scale.  
*Sugar J.*, 1952, 15 (7): 34-40, bibl. 2.
- i HARWOOD, L. W.  
Agriculture in Fiji.  
*J. agric. Soc. Trin. Tob.*, 1952, 52: 303-12.  
Crops mentioned include sugar cane, coconuts, bananas and pineapples.
- j JEX, W. F. C.  
Trash blanketing and fertility [in relation to sugarcane].  
*S. Afr. Sugar J.*, 1952, 36: 625-9.  
A discussion of its advantages.
- k KAUL, K. N.  
A fossil nariel from Rajasthan desert (*Cocos sahnii* sp. nov.).  
*Agric. Anim. Husb. U.P.*, 1951, 2 (3): 9-11, bibl. 3, illus. [received Dec. 1952].  
A shorter account was abstracted in *H.A.*, 22: 3050.
- l KHAN, K. F., AND RAO, I. K. S.  
A note on the vegetative propagation of the durian (*Durio zibethinus* L.) by inarching.  
*Ind. J. Hort.*, 1952, 9 (1): 50.
- m KUMAR, V.  
Studies in *Carica papaya* Linn. III. Economics of papaya cultivation and fruit utilization with special reference to the production of papain.  
*Ind. J. Hort.*, 1952, 9 (1): 36-48, bibl. 13.
- n LAMBERT, C. R.  
Papua and New Guinea.  
*Quart. Rev. agric. Econ.*, 1952, 5: 97-101.  
Crops with good prospects for development include coconuts, rubber, cacao, tea, coffee, kenaf, manila hemp and fresh fruits and vegetables.
- o LEEWARD ISLANDS.  
Annual Report of the Departments of Agriculture and Veterinary Services for 1951, 1952, pp. 114.  
Sugar cane variety, time of planting, spacing and manurial trials.
- p LEROY, J.-F.  
Les Juglandicarya de l'Eocène inférieur et l'Annacocarya actuel. (The Juglandicaryas of the lower Eocene and Annacocaryas of the present day.)  
*Rev. int. Bot. appl.*, 1952, 32: 586-7.
- q MCCULLOCH, A. F.  
The direct determination of fibre content of individual cane consignments.  
*Proc. 26th annu. Congr. S. Afr. Sugar Tech.*, 1952, pp. 85-99, bibl. 3.  
By weighing bagasse continuously.
- r MARTORELL, L. F., AND ADSUAR, J.  
Insects associated with papaya virus diseases in the Antilles and Florida.  
*J. Agric. Univ. Puerto Rico*, 1952, 36: 319-29, bibl. 34.
- s MAUNEY, J. R., AND OTHERS.  
Bioassay, purification and properties of a growth factor from coconut.  
*Physiol. Plant.*, 1952, 5: 485-97, bibl. 13.
- t MORRIS, J. G. L.  
Control of white stem borer of coffee with the use of "Agroicide".  
*Indian Coffee*, 1952, 16: 194.  
Economic advantages from applying this form of BHC on an estate.
- u NAIDU, G. V. B.  
Sugarcane cultivation in Shimoga District.  
*Mysore agric. J.*, 1952, 28: 55-72.
- v NEMA, K. G.  
A fruit-rot of *Carissa carandas* Linn.  
*Sci. and Cult.*, 1953, 18: 337, bibl. 3.  
Due to an *Oospora* sp. believed to be *O. citri aurantii*.
- w PEDREIRA, A. C.  
Contrôle da erosão nos cafézais. (Erosion control in coffee plantations.)  
*Rev. Ceres*, 1952, 9 (49): 54-60, bibl. 2.  
Notes on contour ridging.
- x PERK, C. G. M.  
Twenty-seventh annual summary of chemical laboratory reports. South African sugar factories, season 1951-52.  
*Proc. 26th annu. Congr. S. Afr. Sugar Tech.*, 1952, pp. 14-26.  
Including data on varieties crushed and comparative factory results in Natal and other countries.
- y RAMANAYYA, S. V., MANOHARA RAO, P. J., AND RAJU, K. V.  
A new preservative for sugarcane juices.  
*Curr. Sci.*, 1952, 21: 279-80, bibl. 2.  
Gammexane P.520.
- z R[AYMOND], W. D.  
Notes on the manufacture of desiccated coconut.  
*Colon. Plant Anim. Prod.*, 1952/53, 3: 64-6.  
Types of nut needed and methods of treating them.
2368.  
a REINKING, O. A.  
Soil in relation to banana and abaca diseases.  
*J. Soil Sci. Soc. Philipp.*, 1951, 3 (1): 21-5, from abstr. in *DocumBl. trop. Prod. Amst.*, 1952, 7: 371.

- b RICHARDS, A. V.  
Papaw (*Carica papaya* L.).  
*Trop. Agriculturist*, 1952, 108: 133-4.  
Notes on varieties, planting and harvesting.
- c ROE, F. W.  
*The natural resources of Sarawak*.  
Govt. Printing Office, Kuching, Sarawak,  
2nd edition revised July 1952, pp. 38, illus.  
Straits \$0.50 or 1s. 2d.  
For 1st edition, see *H.A.*, 22: 302.
- d S[MITH], E. H. G.  
Notes on the utilization of and trials with  
*Pueraria phaseoloides* Benth., syn. *P.*  
*javanica* Benth. (tropical kudzu) in certain  
colonial territories.  
*Colon. Plant Anim. Prod.*, 1952/53, 3: 61-4,  
bibl. extensive.  
Trials with *P. phaseoloides* as a cover and  
fodder crop reviewed.
- e STEVENSON, G. C.  
Sugar cane breeding and variety testing  
1951.  
[*Publ.*] *B.W.I. Sugar Ass.*, 1952, pp. 59-62.
- f SUNDARARAJ, D. D.  
Morphology of the normal and abnormal  
fruits in coconut (*Cocos nucifera*, Linn.).  
*Indian Coconut J.*, 1952, 5: 149-52, bibl. 12,  
illus.  
A normal and a 3-seeded fruit compared.
- g TURNER, P. E.  
Report of research work on sugar cane  
agriculture in the British West Indies 1950-  
51.  
[*Publ.*] *B.W.I. Sugar Ass.*, 1952, pp. 1-58.
- h UPTON, T. E.  
A miscellany of planting topics covering  
hedge planting, full spiral tapping, selection  
of planting materials for localities and  
lalang eradication.  
*Planter, Kuala Lumpur*, 1952, 28 (2): 75-80,  
from abstr. in *DocumBl. trop. Prod. Amst.*,  
1952, 7: 317.  
Practical experiences in rubber plantations.
- i VALLANCE, L. G.  
The sugar industry in Australia.  
*J. Aust. Inst. agric. Sci.*, 1952, 18: 208-16.
- j VANDERWEYEN, R.  
La prospection des palmeraies congolaises  
et ses premiers résultats. (A survey of the  
Belgian Congo oil palm groves and its first  
results.)  
*Bull. Inf. I.N.E.A.C.*, 1952, 1: 357-82, illus.  
To find material for selection.
- k WALTER, T. E.  
A survey of some low-country problems [of  
tea in Ceylon].  
*Tea Quart.*, 1952, 23: 60-6.  
With reference to the new low-country tea  
sub-station.

## NOTES ON BOOKS AND REPORTS.

*Books.*

2369. ALEXOPOULOS, C. J.  
*Introductory mycology*.  
J. Wiley & Sons, N.Y., and Chapman &  
Hall, London, 1952, 9×6 in., pp. 482, illus.,  
56s.

The author of this book states in the Preface that its purpose is to answer as simply and concisely as possible the students' question "What are fungi and how do they affect us?" It is not a complete treatise on the fungi and is not intended as a reference book, but it provides a relatively short systematic account of the fungi with brief descriptions of representative species. Agricultural and horticultural students will thus not find details of plant diseases, though certain plant pathogens are included among the selected types. For students of applied botany its value lies in showing the relation between those fungi which have a bearing on such economic problems as plant diseases and the rest of the fungal world, an aspect of botany which the specialist is likely to overlook. For this purpose, the student will find the book admirable, especially as it refers to numerous other sources of information and contains many excellent photographs and drawings (187 in all) and a useful glossary of mycological terms.

H.W.

2370. ANDREWS, F. W.  
*The flowering plants of the Anglo-Egyptian Sudan. Vol. II (Sterculiaceae-Dipsacaceae)*.  
Published for the Sudan Government by  
T. Buncle & Co. Ltd., Arbroath, Scotland,  
1952, 9×5½ in., pp. 485, illus., 21s.

Vol. I of this series has already been reviewed [*H.A.*, 20: 3391]. Vol. II continues with descriptions of genera and species of 48 more families, up to, and including, the Dipsacaceae. The arrangement is on lines similar to those of the first volume. There are 166 excellent figures which illustrate many of the species mentioned, showing in many cases, not only habit and inflorescences, but also details of floral organs and fruits.

2371. BROOKS, R. M., AND OLMO, H. P.  
*Register of new fruit and nut varieties 1920-1950*.

University of California Press, Berkeley and  
Los Angeles (Agents Camb. Univ. Press,  
London), 1952, 9×6 in., pp. 206, 22s. 6d.

This indexed information published at different times in the *Proceedings of the American Society for Horticultural Science* [and noted in *Horticultural Abstracts*] is a compilation of verified facts on the origin and chief characteristics of new fruit and nut varieties originating in North America. It contains short descriptions of 1,106 varieties comprising 49 fruit species. Only varieties which show promise of becoming important commercially or which appear to have characteristics of potential use to the breeder are included. D.A.

2372. CODD, L. E. W.  
*Trees and shrubs of the Kruger National Park*.  
Government Printer, Pretoria, 1951, 9×6  
in., pp. 192, illus., 7s. 6d., being *Dep.*  
*Agric. Bot. Survey Mem.* 26.

The aim of this guide is "to answer in popular terms



such questions as What trees are there in the Park? How may they be recognized? Where else do they occur? Have they any particular interest or economic uses?" In this it should be admirably successful. It is addressed to the South African visitor, the overseas tourist and the student and it will be of interest and value to each. It begins with a description of the geology, soils and topography of the Park, which is 240 miles long by 25-50 wide, and of its vegetation in which 5 different communities are recognized. Then follows a short note on exotic trees and shrubs that have been introduced and finally the main body of the book, an illustrated description of the trees and shrubs of the Park. The 258 species described are arranged in families in the sequence used by Phillips in the *Genera of South African Flowering Plants* and their scientific, common and vernacular names are given. In addition to a description of each in non-technical language notes are given on its uses and other points of interest. There are 6 excellent coloured plates and 165 figures, either black and white drawings or photographs. One important criticism must be made. In a number of drawings no indication of the scale is given. This is not very important when the dimensions of the illustrated part are given in the letterpress. It is a serious omission where they are not, as for example in the case of *Monodora junodii*. J.D.

2373. VAN DILLEWIJN, C.

*Botany of sugarcane.*

Chronica Botanica, Waltham, Mass., and William Dawson & Sons, London, 1952, 10×7½ in., pp. 371, bibl. 617, illus., \$6.00 or 54s.

Few crops have been the subject of such fruitful research in the past fifty years as has sugar cane, and it is doubtful if the results of research on any other crop have been better served than is sugar cane by Dr. van Dillewijn's book. The term "Botany" is used in its wider sense to embrace, not only the morphology and anatomy of the plant, but also its physiology.

The book is divided into two parts. In the first, and shorter, part chapters are devoted to the morphological and anatomical characters of the stem, bud, leaf, inflorescence and root and to a brief evaluation of the use of vegetative characters as an aid to the identification of varieties on the lines worked out by Jeswiet, Artschwager and others.

The second, and much the longer, part is concerned with physiology, nine chapters being devoted, respectively, to germination both of true seed and cuttings, tillering, growth of complete stools and of their aerial and root portions, vegetative composition, chemical composition, nutrition, water relations, photosynthesis and respiration. Each chapter, with the exception of the last, is in turn sub-divided into sections and sub-sections to facilitate quick reference. Thus the longest chapter, that on nutrition, deals separately with each of the major elements in relation to their distribution in the plant, migration, trend of uptake, deficiency symptoms, effects of the element, other factors that influence these effects, and the quantity removed by the crop. Interactions between effects are covered by the liberal use of cross references. Where necessary, experience gained in adjacent fields of study has been used to elucidate physiological behaviour. The notable

contributions made by workers in Java, Hawaii and Mauritius are particularly well covered.

The treatment of the subject throughout is thorough, lucid and eminently readable. Where possible the original authors are allowed to speak for themselves with the aid of tables, graphs and beautifully reproduced diagrams. Dr. van Dillewijn points to the gaps in our knowledge and to the apparent discrepancies that occur in the findings of different authorities, but his attitude is essentially objective and unbiased. This may not altogether please certain modern scientists, especially those in the biochemical world, who tend to dismiss all earlier work done without the aid of the new analytical tools as being largely worthless, but the story as set out here is nevertheless a most satisfying and enlightening one to anyone who is not so prejudiced.

The printing and reproduction of diagrams and illustrations is of a very high order, and the subject index at the end is excellent. Inevitably such a book must have taken several years to prepare, and it is not, therefore, surprising that certain work done in the past 5 years, for example on the factors affecting arrowing and the fertility of pollen, is missing.

In his introduction the author refers to the failure of field practice to keep pace with scientific progress, and to the comparative lack of reference books and abstract periodicals covering the various aspects of cane growing, although the manufacture of sugar is well served in both respects. This Bureau is now endeavouring to fill one gap by supplying as complete an abstracting service as possible. Dr. van Dillewijn's book fills the other gap, in the review literature, in the grand manner. It is likely to become the classic work of reference on the botany of sugar cane. G.K.A.

2374. F.A.O.

*Fruit and vegetables. Production, trade and policies in Europe, 1947-51.*

*Commodity Bull. F.A.O.* 23, 1952, pp. 143, 2s. 6d.

Trade expansion indicates that European exporters generally have found markets for their steadily increasing production despite restrictions, including protective tariffs. *Fresh vegetables*: The production trend is upwards (especially in exporting countries) and the area trend downwards. Imports by the principal importers have increased considerably and exports by the principal European exporters even more so. *Fresh fruit*: Production has expanded appreciably. The orchard fruit production trend is the same in net importing and net exporting countries but the number of trees is rising more in the former than in the latter. Total imports by the principal importers now slightly exceed the pre-war average. Orchard and citrus fruit exports from European countries have increased sharply since 1947, and in 1949-51 orchard fruit exports were more than double the pre-war average. Policies in European countries are surveyed and statistics given.

2375. GARDNER, V. R., BRADFORD, F. C., AND HOOKER, H. D., JR.

*Fundamentals of fruit production.*

McGraw-Hill, New York, London and Toronto, 3rd edition, 1952, 9×6 in., pp. 739, illus., 76s. 6d.

Research on fruit production has made great progress since the 2nd edition of this book appeared in 1939

[H.A., 9: 1510] and it is fair to expect a considerable degree of re-writing in the new 3rd edition. Two new sections, on light relations and on growth regulators, form valuable additions, but the sections on propagation and geographical influences that were in the 2nd edition have been omitted to keep the book within the prescribed limits. It is particularly unfortunate that propagation is no longer included, as it is the beginning of all fruitgrowing and the section covered a field of great value to the student. Recent work on vegetative propagation, selection of seed parents, apomictic species as rootstocks, rootstock-scion effects and incompatibility are all worthy of inclusion. The majority of the other revisions consist of additional sentences here and there with occasional new paragraphs, being especially noticeable with the trace element deficiencies. The term "recent" is applied without change to work done from 1920 onwards—doubtless the results were recent when first mentioned in the book but surely the term might now be removed with advantage from all references prior to, say, 1945? The bulk of the tables date from the turn of the century, but one would imagine that in many cases more reliable figures have been obtained by modern research.

The whole question of virus disease is too modern to appear and lithiasis of pears is attributed to drought or insects without mention that it is sometimes of virus origin. Black-end of pear in Oregon is ascribed to drought (1921 reference), and not brought up to date by later work, which has shown the trouble to be an effect of oriental pear rootstock. In the bibliographies at the end of each section the small number of post-war references is striking.

The task of revising a work of this magnitude and of bringing it into line with the rapid advance of knowledge in the subject is formidable and probably beyond the power of any one man alone, but has not the time come when Professor Gardner might tackle a substantial re-writing of the book with the aid of a few of the many competent young American workers in Pomology? Until then and despite all shortcomings the present work must still be considered the most complete textbook available on Pomology and a valuable aid, not only to the students for whom it is written, but also for the research worker and the practical horticulturist.

H.B.S.M.

2376. GEIGER, R. [STEWART, M. N., AND OTHERS translators].

*The climate near the ground.*

Harvard University Press, Cambridge, Mass., 1950, 8½ × 5 in., pp. x+482, bibl. 821, illus. [received 1953], \$5.

The climate near the ground is encountered in that disturbed air layer near the surface of the soil, which the meteorologist avoids by placing his instruments at a height of 1.5–2 m. above ground level. Obviously, it is of particular importance to plant ecologists and pathologists and to agriculturists in the widest sense. A first attempt to survey microclimatological problems was made by Geiger at Munich, in 1927, when he published *Das Klima der bodennahen Luftschicht*. The foundations of the new science having been laid in Germany, the book became a standard work and was translated in the United States. A second German edition, enlarged and completely re-written, appeared

in 1941 with the sub-title: a textbook of microclimatology. It is from this edition, with alterations and additions supplied by the author, that the new translation was made which now corresponds to the 3rd German edition.

Brief references to its contents will show how closely this manual concerns the horticultural research worker. Part I deals with the influence which the ground exerts on the climate of the boundary layer of air next to it, up to a height of about 2 m. Sections I–IV treat respectively: heat relationships near the ground; temperature relationships near the ground; other meteorological elements near the ground, including humidity and wind relationships; and lastly the influence of the ground itself on the climate near it, including the influence of the type and condition of the soil (tillage, soil moisture, immediate effect of rain, etc.) and the characteristics of the air layer above a sod cover.

In Part II, devoted to the microclimate in its relations to topography, to plants, animals and man, the author does not limit himself strictly to the lowest two metres of the atmosphere. The influence of topography, for instance, dealt with in Section V, concerns the climate of valleys and slopes, an intermediate sphere between micro- and macroclimate, which has also been called mesoclimate. Section VI, entitled *The influence of plant cover*, is of special interest to the plant scientist, particularly in chapters entitled "The heat economy of plants and plant temperatures", reference here being made to vines, coffee and sugar cane, and "Humidity and wind relationships in a low plant cover". Later sections dealing with climatological phenomena in forests contain much information more or less directly applicable to orchards. The book ends with a brief discussion on frost damage and frost protection.

V.H.G.

2377. GOODWIN, T. W.

*The comparative biochemistry of the carotenoids.*

Chapman & Hall, London, 1952, 9 × 5½ in., pp. 356, bibls. extensive, 50s.

This book has been written to meet the needs of those interested in the occurrence and function of carotenoids in plants and animals. It opens with an introductory chapter setting out definitions and nomenclature, and then divides into two parts of about equal length. The first part deals with plants, beginning with a description of carotenoids occurring in Phanerogams and a discussion of their formation and function. Next, attention is directed to the Cryptogams. Little is known about the Bryophyta and Pteridophyta and these phyla are only briefly mentioned. The Thallophyta, except for the lichens, have attracted much more attention, and the fungi, algae and bacteria are reported in great detail. The second part of the book deals with animal carotenoids. This part of the book ends with a good chapter on the conversion of carotenoids into vitamin A. There are two appendices, the first giving the carotene content of plants in tabular form whilst the second, based on the work of R. S. Harris and his colleagues, lists the carotene content of foods grown in Central America.

Dr. Goodwin, who himself has made important contributions to the systemic study of the carotenoids, has brought together a mass of material scattered in



many scientific journals, and skilfully arranged it so that comparisons can be made. In doing this he has stated controversial issues with praiseworthy fairness, giving the evidence that forms the basis of the different schools of thought. He has not hesitated to say when evidence is unsound or unconfirmed. This critical treatment is most helpful to workers who are interested in, but not very familiar with, carotenoid chemistry. Digestion of the wealth of detail is made an easier task by the author's interspersed comments and summaries. At the same time the gaps in this most fascinating story are made clear, and here surely is an invitation for those interested in the biochemistry of carotenoids to strive to fill some of these intriguing lacunae.

In view of the role of carotene as a precursor of vitamin A, it is natural that a great deal of attention has been paid to this aspect of the subject, but, as the author points out, this is not the only important facet of carotenoid chemistry. The riddle of their other functions remains to a large extent unsolved. It seems fairly certain that they are concerned in photokinetic responses. They also appear to have a part to play in the intricate arrangements of sexual reproduction, but the exact nature of this role is not at all certain. There remains the point of view that the carotenoids are merely excretory products. This facile explanation has been advanced to account for the presence of many compounds occurring in plants and animals. In many cases evidence has been presented to refute this assertion. It is unlikely to be true in the case of the carotenoids, since it is known that in the cell they are almost always rendered soluble by attachment to proteins.

The book contains numerous tables, formulae, diagrams and a wealth of spectrographic data. Subject, author, and specific name indexes are given. It is true that there are several typographical errors, and some of the references cited in the text are missing from the bibliography given at the end of each chapter, but these are minor errors which will no doubt be subsequently removed. They detract little from the merits of this excellent book which ought to be on the shelves of every biochemist.

A.E.F.

## 2378. I.N.E.A.C.

*Flore du Congo belge et du Ruanda-Urundi. Spermatophytes. III. (Flora of the Belgian Congo and Ruanda-Urundi. Spermatophytes. III.)*

Institut national pour l'étude agronomique du Congo belge, Brussels, 1952, pp. 579, illus.

This volume covers the families Rosaceae, Connaraceae, Mimosaceae and Caesalpiniaceae, and contains 40 full-page plates and 46 figures.

## 2379. LINKE, W., AND REBL, A.

*Der Hopfenbau. (Hop culture.)*

Hans Carl, Nuremberg, 1950, 2nd enlarged edition, 8×6 in., pp. 345, bibl. 47, illus. [received Dec. 1952], DM. 16.

To German growers and students the publication of Linke's hop culture in a second, enlarged edition is bound to be a welcome event, and it is likely to arouse some interest also in Britain in view of the scarcity of modern textbooks on the subject. The author's object is to deal fully with all practical aspects of hop growing from planting and wiring to harvesting, drying and

marketing, and in addition to impart some fundamental knowledge of hop botany and chemistry to the agricultural student. The bulk of the German hop industry is concentrated in the Hallertau, Bavaria, where approximately 7,000 holdings cover about 4,575 hectare with an average annual yield of about 26 znt./hectare [approx. 1,160 lb. per acre] during the period 1931-40. The two most important parasites of the crop are downy mildew and red spider; *Verticillium* wilt is not mentioned at all, and only one brief reference is made to a sporadically occurring leaf curl which might be a symptom of virus infection. Most of the varieties grown are of local origin, only Golding having become established to some extent. Where breeding is carried out, it aims chiefly at downy mildew resistance and increased yields. The latest development in the utilization of bines (1,200 kg./hectare) is the manufacture of light building slabs from them. Many photographs and schematic drawings illustrate all phases of hop growing, those on trellis and kiln construction being perhaps the most helpful. The chapter on marketing is by A. Rebl.

V.H.G.

## 2380. MANN, P.

*Systematics of flowering plants. An introduction.*

Methuen & Co., London, 1952, 7½×5 in., pp. 307, bibl. 1½ p., illus., 18s.

The book is divided into 4 parts. Part I contains a discussion of the categories and methods of classification and a history of classification and nomenclature. There are also sections on variation and adaptation, genotypic variation, the consequences of mutation, and their significance for systematics. The importance of variation is kept before the reader throughout the book. Part II—the main part of the book—illustrates for the 12 families listed in the syllabus for the General Certificate of Education Examination the criteria which are important in classification. For each family a general description of the common characters is followed by an account of such subjects as its systematic position, chemistry, vegetative propagation, economic value, variation and classification, and a description of the methods of pollination and dispersal. In Part III the morphological terms used are defined, and in Part IV instructions are given for the preparation of floral diagrams and diagrams of the vertical section and half flower. Parts II, III and IV are illustrated by the author. Her drawings, especially in Part II, are of a high standard and would have been of even greater value if they had been a little larger. The method adopted of indicating the actual dimensions of the illustrated parts is that of giving the length and/or breadth in metric measurements. There is a chronological list of important dates in systematic botany and allied subjects; and a geological table showing the chief types of plant in each period.

J.D.

## 2381. MYERS, A.

*A manual of seed testing.*

New South Wales Department of Agriculture, Sydney, 1952, 8½×5½ in., pp. 80, illus., 2s. 6d.

The book was written for the seed analyst in the commercial laboratory, particularly the student seed analyst. It describes the techniques standardized throughout the world in accordance with the rules

formulated by the International Seed-testing Association. The instructions are supported by photographic illustrations of the equipment. Methods of chemical seed-testing as a complement to, or in place of, the usual germination tests are discussed in an appendix.

2382. NAIK, K. C.

*South Indian fruits and their culture.*

P. Varadachary & Co., Madras, 1949,

9×6 in., pp. 477, bibls. numerous, illus.,

R. 15 [received 1953].

In India the form taken by fruitgrowing from the earliest historical times, has been that of the garden rather than that of the large plantation. Hence a multiplicity of varieties and of varying local practices has arisen. The impact of science, as opposed to art, is of very recent origin and still remains to make itself felt among a large proportion of growers.

Mr. Naik, who appears to belong to the older school of pomologists who have a real affection for their trees and not merely an absorbing interest in small bits of them, has attempted in this book to give a simple account of what is best in the traditional methods and to graft on to them improvements suggested by the results of research, notably at Kodur, and by experience in other countries.

The subject is dealt with in two parts. In the first, ten short chapters are devoted to the present status of fruitgrowing in South India, climatic conditions and soils, and nursery and orchard practices. The information is largely of a general nature and in certain respects suffers from over-simplification, but some aspects of local experience may well be of interest in other countries.

The second and longer part of the book consists of accounts of particular fruits, and it is three relatively long chapters, on mangoes, citrus, and bananas respectively, which are of particular interest. In each case considerable space is devoted to the description of varieties, with the mango over 80 [see also *H.A.*, 21: 1203], with the banana (and plantain) about 30, and with citrus various types, both indigenous and exotic. Propagation is also well covered, including in the case of citrus the use of the wood apple (*Feronia elephantum*) as a dwarfing rootstock for sweet orange. Planting, irrigation, harvesting, packing and the economics of production are also discussed. The results of experiments at Kodur are freely cited throughout.

The five remaining chapters are devoted to short accounts of many other fruits grown in the hills or on the plains, in humid climates and in dry, in South India. Among those dealt with in rather more detail than the majority are apples, pears, plums, peaches, grapes and guavas, and here again the references to varieties and to local cultural practices may be of interest in other tropical countries, especially those with highland zones. References to literature, largely Indian, are given at the end of each chapter or section, and a rather sketchy combined author and subject index is provided at the end. The print is large and clear and there are numerous illustrations of somewhat variable quality. There are also a number of errors, as for example on page 423, where the author warns us specifically not to confuse sapota (sapodilla, *Achras zapota*) with the sapote and then falls into the pit himself by referring to the latter as *Achras zapota*. The coloured plate facing page 328

and purporting to be an apple tree in bearing is either a most unusual variety or, as seems more likely, another fruit altogether. Inevitably, too, some of the statements made will not meet with universal approval. These defects apart, the book fills a very real gap in the literature on fruitgrowing in India and should prove of considerable interest and value to the students and growers for whom primarily it was written. Those pomologists in other tropical and subtropical countries who have not yet become so specialized that they can no longer see the trees for the wood, will also find much to interest them. G.K.A.

2383. PRESTON, R. D.

*The molecular architecture of plant cell walls.*

Chapman & Hall, London, 1952, 9×5½ in., pp. 211, bibl. 77, illus., 36s.

Botanists and others interested in plant science are aware that during the last thirty years or so certain physicists have been making a close examination of natural cellulose, using such powerful tools as the X-ray spectroscope and the electron microscope. It has leaked out that something new and fundamental is coming to light concerning plant cell walls, something that the botanist feels he ought to know, but to him the necessarily highly technical jargon of unfamiliar techniques, in which the original papers are couched, presents such a barrier that often he finds it difficult even to grasp exactly what discoveries are claimed, much less can he examine the evidence and foresee the implications. In this book, Dr. R. D. Preston undertakes to act as guide to those who seek a path across the barrier and rewards those who walk with him, not merely with a glimpse, but with a conducted tour of the Promised Land, so far as it has as yet been revealed. To those whose training has mainly been in other branches of science, the path to be followed is arduous, but Dr. Preston rightly feels that he would be doing botanists and others a poor service if he presented the results of research in a series of *ex cathedra* statements. He therefore devotes nearly half his book to an exposition of the underlying principles on which the physical methods are based. Without some understanding of these principles, neither appreciation of the elegance of both experimentation and logical deduction nor critical appraisal of the results is possible.

The book begins with two excellent introductory chapters, while a third gives an outline of the chemical nature of cell-wall constituents. There follows an attempt to present the fundamental bases of the methods of analysis of structure by optical and X-ray methods. To the reviewer it seems doubtful if the difficulty of the subject to the reader, presumed to have at most but a moderate knowledge of modern physics, has here been sufficiently appreciated. Greater clarity could only be obtained, perhaps, by expansion of this section, but it would be a justifiable expansion. Much that is to follow, for example, is based on the interpretation of "rotation photographs", but it is feared that neither the text nor the diagram purporting to explain the essentials will make the tyro much wiser. The succeeding chapter, after dealing with the molecular weight of cellulose and the Micellar Hypothesis, goes on to describe the production of electron micrographs—an excellent example of which provides an appropriate



frontispiece—so concluding the first section of the book. The second and larger section is concerned with the consideration of wall organization in plant cells in terms of the submicroscopic structure of cellulose. Step by step it is shown how the nature of what might loosely be described as a "ply-wood" structure has been deduced for various cell-walls, ranging from the "three-ply" conifer tracheids to the "multi-ply" walls of Valonia. Discussion of wall structure in these thick cell-walls turns attention to the primary walls of growing cells and ineluctably we are led in the grand finale to a consideration of the mechanism of orientation and growth.

It is a fascinating story, delightfully told, one requiring close attention, maybe, but rewarding, for the author not only gives the facts, so far as they are known, but also attempts to show them in their true setting as a record of cellular activity throwing light on the most fundamental processes of growth. Here our guide becomes philosopher and friend as well. As a philosopher, he follows a logical path to the frontiers of knowledge to peep at what may lie beyond. As a friend he is eager to share the pleasure and excitement he has found as one of the leaders in the difficult and laborious work of exploration. In all three capacities he is strongly recommended. Dr. Preston is to be congratulated on the production of an outstanding book. A.E.B.

2384. ROBBINS, W. W., CRAFTS, A. S., AND RAYNOR, R. N.  
*Weed control.*  
McGraw-Hill Publ. Co. Ltd., New York, London and Toronto, 2nd edition, 1953, 9×6 in., pp. 503, bibls. extensive, illus., 57s. 6d.

Among the most spectacular developments in agricultural research during recent years are those which concern weed control. In the struggle for increased food production weeds are being rapidly accorded the attention hitherto given to pests and diseases. The output of literature is becoming ever greater and we are indebted to the authors for much hard work in re-writing to a considerable degree, and bringing up to date their admirable critical review first published in 1942 [*H.A.*, 13: 659]. While the sections on weed control by cultural, mechanical and biological methods have been altered but little, the larger part of the book dealing with chemical weed control has been changed almost beyond recognition. Thus apart from the new chapters on new herbicides of the hormone-like type, the profound alterations made become obvious from a glance at the dates of some of the selected references quoted at the end of each chapter. The discovery of 2,4-D as a selective herbicide has revolutionized weed control, particularly in the Western Hemisphere. In Great Britain MCPA is the most widely used hormone-like selective weed killer. Other chemicals of this group such as TCA, IPC and maleic hydrazide are promising new selectives, and for specific weeds or in certain crops they have been already well proved. That the use of herbicides is of great agricultural importance and their manufacture is becoming a lucrative line for the chemical industries is clearly illustrated by the fact that in 1949, 20,000,000 lb. of 2,4-D were produced in the United States, though the average dosage probably did not exceed 1 lb. per acre. There has been marked improvement in the

equipment used for the different methods of chemical application, and some of the ingenious devices developed to prevent the contamination of crops, or for spraying inaccessible areas such as banks of ditches are clearly indicated. The book is well illustrated throughout and the charts, diagrams, comparative photographs and tables presented make the use of herbicides and their action appear simple even for the uninitiated. The wealth of information provided makes this volume most valuable for all interested in the suppression of weeds, and the last 4 chapters dealing with weed problems in grassland and turf, cropped areas, uncropped areas and control of special weeds constitute an up-to-date guide for growers till such time as newer and more startling discoveries are made in this now fashionable line of research. E.U.

2385. RODRIGUES, A.

*Um método filométrico de caracterização ampelográfica.* (A method of identifying vines by leaf measurement.) [Portuguese and French. English summary  $\frac{1}{2}$  p.] Serviço Editorial de Repartição de Estudos, Informação e Propaganda, Lisbon, 1952, 11×8 $\frac{1}{2}$  in., pp. 42, bibl. 20, illus.

The author, who is on the staff of the Portuguese National Agronomy Station, describes a new phyllo-metric method which he proposes for the identification of vines. The method is based on the outline of the leaf and statistical treatment of the results is possible. It consists essentially of the determination of the mean position of the ends of the veins and of the inner angles of the leaf lobes. Each half of the leaf is considered separately and the length of the median vein of the leaf is used as a constant. Factors used either separately or in combination in the biometric identification of adult leaves are shape, dimensions, veins and general outline. Among points discussed are the conditions under which leaves are comparable, the method of selecting material for measurement, the significance of common malformations in the statistical interpretation of the results, and the value of accurately describing leaf polymorphism. [See also *H.A.*, 23: 1374.]

2386. SÖDING, H.

*Die Wuchsstofflehre. Ergebnisse und Probleme der Wuchsstoffforschung.* (The theory of growth substances. Results and problems of research on growth substances.) Georg Thieme Verlag, Stuttgart, 1952, 9 $\frac{1}{2}$ ×7 in., pp. 305, bibl. extensive, illus., DM. 33.

Here is a highly competent digest of advance made in our knowledge of growth substances, natural and synthetic, since the early books by Went, Boysen Jensen and others some 15-20 years ago.

Its disadvantages for an English reader, in the opinion of the reviewer, include the language—limpid German, but, regrettably enough, it might as well be "double Dutch" to most Englishmen—an inadequate subject index and its archaic, though economic, method of citing references, namely as footnotes, generally without the title.

Having said that, one must hasten to add that the German really is limpid and understandable to one possessed of a mere rudimentary knowledge of the

language and but a little persistence, and that the inadequacy of the index is somewhat compensated for by the completeness of the 4-page list of contents. We therefore encourage our experts to buy this finely produced reference work and to pick from it without trouble and at their leisure its desirable plums of wisdom.

The subjects which form the main headings under which the author deals with his exciting subject are as follows: Methods of determining the presence of g[rowth] s[ubstance(s)]. Extraction of natural and synthetic g.s. Distribution of g.s. in the plant and its influence on the growth of particular parts of plants. Formation of g.s. in the plant and its dependence on external and internal factors. Interrelation of g.s. to size and health of plant. Movement of g.s. in the plant. Chemistry of growth and growth inhibiting substances. G.s. and tropisms. G.s. and cell division. G.s. and root formation. G.s. in relation to growth inhibition. G.s. and regeneration. G.s. in relation to bud development and germination. Direct effect of g.s. Position of g.s. *vis-à-vis* other active plant principles.

In a final enthusiastic note we are carried away by the author's enthusiasm to believe that in the study of growth substances may lie the key to the first and last secrets of biology.

D.A.

2387. WICKIZER, V. D.

*Coffee, tea and cocoa. An economic and political analysis.*

Stanford University Press, California, and Geoffrey Cumberlege, Oxford University Press, London, 1951, 9½ × 6½ in., pp. 497, bibl. extensive, \$5.00 or 40s.

The author is a member of the staff of the Food Research Institute established at Stanford University, California. His book is the first of a series of some twenty new studies to be issued under the title "Food, Agriculture and World War II". In a preface, J. S. Davis, the Director of the Institute, explains that the studies fall into three main groups, the first dealing with the wartime management of food and agriculture in individual countries, the second with international organization and controls, and the third, amongst which is the present book, with international commodity developments.

The economic and political analysis is presented in the four parts, one each devoted to the world's three most important beverages and one to a general consideration of future trends and problems. The period covered is primarily that leading up to, during, and since, the second world war, but as a background to the analysis the earlier history of the crops is sketched and brief outlines given of the more important aspects of their culture, including the impact of such major diseases as swollen shoot of cacao and blister blight of tea. The grower will not find much that is new in these agricultural details, but they should be of assistance in forming a balanced picture to the politicians, economists, manufacturers and others concerned with interpreting former policies and formulating new ones. The grower, or rather his political representatives and the organizations responsible for administration or the marketing of his produce, will find food for thought in the general discussion of future trends and new techniques in relation both to plantation agriculture and to

peasant-type farming and in an appendix devoted to costs of production.

The reviewer cannot claim to have more than a very superficial knowledge of some of the economic and political aspects of world trade in these three commodities, and in particular would dislike to have to pass judgment on the rights and wrongs of such international controversies as the post-war disagreements between Britain and the U.S.A. over the purchase of cocoa. It would appear, however, that Mr. Wickizer has endeavoured to observe strict impartiality. The views of both sides have been given in detail, often with quotations from reports and statements and with the aid of copious footnotes and references. This does not make for easy reading but enhances the value of the book as a factual analysis.

Although books concerned with trade and matters of high policy lie very largely outside the normal scope of this Bureau's activities, their advent provides a healthy reminder that the producer is merely one link in the elaborate chain which constitutes world trade. As to the research worker, an occasional excursion into the realm of economics can do no harm.

G.K.A.

### *Annuals and reports.*

2388. HELLYER, A. G. L.

*Amateur gardening annual 1953.*

Amateur Gardening, Tavistock Street, London, 1952, pp. 136, 5s.

A pleasantly produced, helpful book for the amateur gardener interested particularly in flower production.

2389. FARM MECHANIZATION.

*Farm Mechanization Directory 1953.*

Temple Press Ltd., London, 1952, 8½ × 5½ in., pp. 589, 10s. 6d.

This useful more than half-a-guinea's worth affords information on organizations in Great Britain interested in agricultural machinery, British manufacturers of farm machinery, specification of tractors, lists of other implements and information on where they may be bought.

2390. BRITISH GUIANA.

*Annual Report of the British Guiana Department of Agriculture for 1950,* 1952, pp. 43 [received 1953].

Sugar, coconuts, bananas, inception of cacao trials with Colonial Development and Welfare funds.

2391. MINISTER OF AGRICULTURE, CANADA.

*Report of the Minister of Agriculture for Canada for the year ended March 31, 1952,* 1952, pp. 117, 50 cents.

*Science Service:* fungal diseases and insect pests of tobacco, vegetables, tree fruits, small fruits and ornamentals; diagnosis of seed-borne bacterial pathogens; insecticides; miscellaneous insects and nematodes; bee diseases. *Experimental Farm Service:* apiculture; C.M.U. herbicide; horticulture (hardy framework apple stocks, chemical thinning of apples, club thinning of peaches, new tomato and melon varieties, ornamentals, plant nutrition, processing); tobacco. [See separate abstracts.]



## 2392. CAWTHRON INSTITUTE.

*Annual Report of the Cawthron Institute, New Zealand, 1951/52*, Nelson, pp. 42, bibl. pp. 24.

*Plant nutrition investigations*: Mineral and nitrogen content of hops; distribution of dry matter in hop plants; penetration of borax in soil. *Fruit research*: Boron deficiency in raspberries; magnesium deficiency of apples; zinc and copper deficiencies; apple rootstock experiments. *Tomato research*: Soil sterilization; amendments for glasshouse soil; the effect of fertilizers on fruit quality; "cloud"; mulching with sawdust. *Hop research*: Boron deficiency; leaf composition; black root-rot (*Phytophthora cactorum*). *Tobacco research*: Mosaic; black root-rot; *Verticillium* disease; canker (a strain of *Phytophthora parasitica*); effect of fertilizers and cultural practices on leaf composition and quality. *Entomological investigations*. [See also separate abstracts.]

## 2393. CHESHUNT.

*37th Annual Report Cheshunt Experimental and Research Station for 1951*, 1952, pp. 96, bibls., illus.

A large number of the articles on research projects at Cheshunt which appear in this report will be found separately abstracted.

## 2394. PALMIRA.

*Memoria Estación agrícola experimental de Palmira. 1951. (Annual report of the Palmira agricultural experimental station for 1951)*, 1952, pp. 85, illus.

*Cacao*: selection, vegetative propagation, fermentation, pollination, investigation of a disease of trees grown from cuttings. *Sugar cane*: breeding and selection, yield trials. *Plant physiology*: cacao shade, foliar sprays of P fertilizer, cacao self-fertility and self-sterility, citrus pest control. *Fruitgrowing*.

## 2395. ANDERSEN, H.

1.-3. årsberetning fra Statens Plantetilsyn vedrørende frøpatologisk kontrol. 1. april 1948 -31. marts 1951. (1st-3rd Annual Reports of the Danish Service for Seed Pathology. 1 April, 1948-31 March, 1951.) [English summary 1 p.] *Tidsskr. Planteavl*, 1952, 56: 67-86.

The Reports, which are largely based on those of J. E. Ohlsens Enkes Phytopathological Laboratory [see H.A., 16: 2333], record seed pathogens of vegetables, ornamental and other plants.

## 2396. I.N.E.A.C.

*Rapport annuel pour l'exercice 1951. (Report of the work of the I.N.E.A.C. Stations, 1951)*. Institut national pour l'étude agromomique du Congo belge, Brussels, 1952, pp. 436, 160 fr.

The volume includes reports from Yangambi research station and various sub-stations. The Yangambi report covers the following subjects. *Plant physiology*: mineral nutrition of oil palm and cacao, growth rate of young oil palm and cacao. *Phytopathology and entomology*: survey of chief diseases of coffee, cacao, oil palm and hevea, experimental inoculation of oil palm with fusarium tracheomycosis, research on cacao borers

including *Glenea fasciata*, inventory of insect pests of oil palm, control of *Dichocrocis crocodora* on robusta coffee, of *Antestia bechuana* on arabica coffee, of *Helopeltis orophila* on cinchona, tobacco diseases and pests. *Oil palm*: selection and cultural experiments. *Hevea*: tests on precoagulation, tapping, dry rubber content of latex; selection; varietal trials. *Coffee*: selection, experiments on pruning, shading, manures, grafting and cuttings. *Cacao*: selection, cultural experiments (planting distance, shade, cuttings).

2397. INSTITUTE OF PARK ADMINISTRATION (BARKER, B. T. P., AND HUDSON, J. P.). *Report of the Annual Conference of the Institute of Park Administration*, Nottingham, July 8th-10th, 1952, pp. 72.

Includes papers by Professor B. T. P. Barker on Science in the Development of Horticulture and by J. P. Hudson on Facilities for Training in Horticulture.

## 2398. LAUSANNE (GALLAY, R.).

Stations fédérales d'essais agricoles de Mont-Calme et Montagibert, Lausanne et Pully. Rapport d'activité 1951. (Annual Report of the Swiss Agricultural Research Stations Mont-Calme and Montagibert, Lausanne and Pully, for 1951.) *Landw. Jb. Schweiz*, 1952, 1 (n.s.): 915-1140, bibl. 48.

I. Current investigations include: *Plant improvement*: tobacco, pome and stone fruit and stone fruit rootstocks, vine, tomato, strawberry, raspberry and gooseberry; vine pruning; must and wine quality. *Inspection of seed and of plant material for vegetative propagation*. *Disease and pest control*: Cockchafer and white grub, San Jose scale, cherry fruit fly, Mediterranean fruit fly, degeneration of vine. *Publications*. II. Original contributions: Berry drop in vine, mildew control in vine, grape storage, the cultural and oenological value of red vine varieties. [See separate abstracts.]

2399. MADRAS DEPARTMENT OF AGRICULTURE. *Administration Reports of Subordinate Officers of the Department of Agriculture, Madras for 1950/51*, 1952, pp. 804.

*Coimbatore. Oil seeds specialist*: coconut, castor, cashew nut and oil palm. *Fruit specialist*: mango and other tropical fruits, citrus, banana, apple, plum, peach, vegetables, wild nutmeg as possible rootstocks for cultivated nutmeg, pyrethrum. *Entomologist*: pests of vegetables, fruits, oil-seeds, biological control of coconut black-headed caterpillar (*Nephantis serinopa*). *Mycologist*: pepper, ginger, orange, melon, vegetables, cinchona. *Anakapalle. Sugar cane specialist*: varietal, cultural and manual trials, physiology, smut and red-rot, shoot and stem borers.

2400. DIVISION OF HORTICULTURE, NEW ZEALAND (GREIG, A. M. W.).

*Report of the Director, Horticulture Division, New Zealand Department of Agriculture. A.R. N.Z. Dep. Agric. for 1951/52*, 1952, pp. 64-82.

Pip-, stone-, berry-, citrus- and other subtropical fruits; grape production; hops; tobacco; vegetable seed-growing, variety trials, nutrition and disease



control; brief reports from Horticultural Research Stations; enforcement of plant quarantine regulations; cool storage of fruit and vegetables; numbers of commercial deciduous- and citrus-fruit tree species in March 1952, and some production figures.

#### 2401. PENNSYLVANIA.

Science for the Farmer, being 65th Annual Report of the Pennsylvania Agricultural Experiment Station for the year ending 30th June 1952, pp. 69, illus., issued as Bull. Pa agric. Exp. Stat. 553.

*Floriculture*: indoor roses—corn cob mulch, increased production by “pinching” non-flowering shoots, spraying with iron salts for deepening foliage colour. *Mushroom growing*: control of *Pigmaeophorus* mites, flies and nematodes. *Orcharding*: foliar diagnosis, bone tar oil as deer repellent, control of mites and plum curculio, ring spot and yellows virus in cherries. *Tobacco culture*: control of sucker growth by mineral oil, increased yields with K plus krillium, seedbed control of grass, weeds and blue mould by chemical treatment. *Vegetable growing*: tomato and sweet corn breeding, control of cabbage maggot with the newer chlorinated compounds, spray control of tomato early blight.

#### 2402. QUEENSLAND.

Annual Report of the Department of Agriculture and Stock for the year 1951/52, 1952, pp. 125, illus.

*Agriculture Branch*: tobacco. *Horticulture Branch*: fruits and vegetables. *Science Branch*: pathology, entomology. [See separate abstracts.]

#### 2403. VALDEYRON, G.

Rapport sur les travaux de recherche effectués en 1951. (Report on research in 1951.)

Ann. Serv. bot. agron. Tunis., 1950, 23 (suppl.): 1-29 [published 1952].

Notes are given on research into the selection and multiplication of market garden and tree fruit crops and vines, on crop protection against *Ceratitis capitata*, and other pests, and on weed control. [See separate abstracts.]

#### New periodicals.

#### 2404. STUDEKRIK VOOR PLANTENVEREDELING, WAGENINGEN.

*Euphytica*. Netherlands Journal of Plant Breeding, 1952, Vol. 1, No. 1, pp. 80, illus., Fl. 15 (about \$4) p.a.

In order to make good the lack of a scientific journal in which Dutch plant breeders could publish and bring together the results of their work and make them available to scientists in other countries, the Study Centre for Plant Breeding at Wageningen has decided to issue this highly specialized periodical. It is to appear 3 times a year and will contain original articles, summaries of papers read at meetings of the Study Centre, abstracts of articles from other Dutch journals, and book reviews. The publication is almost entirely in English, the original articles having Dutch summaries and the few papers which are written in Dutch having English summaries. Most of the papers are concerned

with plant breeding and improvement work carried out in Holland, but space is also given to the work of Dutch investigators abroad and, occasionally, to that of foreign workers. This well produced, high standard journal should do much to stimulate international co-operation in the field of plant breeding.

#### 2405. INTERNATIONAL COMMISSION FOR PLANT RAW MATERIAL.

*Materiae Vegetabiles*, Vol. I, No. 1, 1952, pp. 128, Dr. W. Junk, The Hague, Holland, Fl. 40 per volume.

This new journal from Switzerland [editors] and Holland [publishers] is the organ of the International Commission for Plant Raw Materials set up as the result of the International Botanical Congress at Stockholm in 1950.

It is “dedicated”, we are told in the introduction, “to the whole domain of vegetable raw materials, . . . a connecting link on the one hand between research, cultivation and extraction, amelioration, preparation and utilization on the other”. In fact the editor should not be short of papers which, it is proposed, will appear in “grammatically correct English, French, German, Italian or Spanish”.

The first number contains two or three articles of horticultural or nearly horticultural interest, e.g. on the utilization of fibres from the stems of edible bananas, on the Casuarinas as tanning materials. The journal will appear 4 times a year.

May one indolent Englishman without a paper knife ungrammatically but “right now” put in a plea that the leaves shall be cut before issue on each occasion? Otherwise, for paper, appearance, diagrams, etc., full marks! D.A.

#### Noted.

#### 2406.

##### a AUSTRALIAN CANNED FRUITS BOARD.

Twenty-sixth Annual Report of the Australian Canned Fruits Board for year 1951/52, 1952, Melbourne, pp. 27. Apricots, pears, peaches, pineapples and mixed packs.

##### b CYPRUS (MORRIS, H. M.).

Annual Report of the Cyprus Department of Agriculture for 1951. Annexure III. Annual Report of the Entomologist for 1951, [1952?], pp. 8 [received 1953].

##### c CYPRUS (JONES, D. K.).

Annual Report of the Cyprus Department of Agriculture for 1951. Annexure V. Annual Report of the Agricultural Research Officer for 1951, [1952?], pp. 14 [received 1953].

##### d Report of the Edinburgh and East of Scotland College of Agriculture for the year ending 30th September, 1951, [1952?], pp. 148.

##### e FOOD AND AGRICULTURE ORGANIZATION. Report on activities of F.A.O. under the expanded technical assistance program 1950/52. F.A.O., Rome, 1952, pp. 76, illus.



- f STATIONS AGRONOMIQUES (BOISCHOT, P.). Travaux effectués en 1950 par les Stations agronomiques. (Work carried out by the agricultural research stations [of France] in 1950. *Ann. agron. Sér. A*, 1951, 2: 485-725, bibl. pp. 4½. [See separate abstracts.]
- g HORTICULTURAL EDUCATION ASSOCIATION. H.E.A. *Annual Report 1951*, 1952, pp. 128, obtainable from Editor, H.E.A., "Tilings", Shamley Green, near Guildford, Surrey, England. [See separate abstracts.]
- h KENYA. *Annual Report of Kenya Department of Agriculture for 1951*, Vol. I, 1952, pp. 53, 3s.
- i MAURITIUS. *Annual Report of the Mauritius Department of Agriculture for 1951*, 1952, pp. 89, Rs. 1.25 [received 1953]. Sugar cane, tea, tobacco. [See separate abstract on pests of cane.]
- j MINNESOTA. *58th Annual Report Minnesota Agricultural Experiment Station 1950/51*, pp. 39.
- k LONDON ADVISORY COMMITTEE FOR RUBBER RESEARCH. *Report of the London Advisory Committee for Rubber Research (Ceylon and Malaya) for 1951*, Imperial Institute, London, S.W.7, 1952, pp. 22. Administrative report followed by Superintendent's report on various processing projects.
- l SARAWAK. *Annual Report of Sarawak Department of Agriculture for 1951*, 1952, Government Printer, Kuching, pp. 71.
- m SEYCHELLES. *Annual Report of the Seychelles Department of Agriculture for 1951*, [1952?], pp. 32.
- n UGANDA. *Department of Agriculture, Record of Investigations, No. 2, 1949/50*, pp. 63, shs. 2/50. [See separate abstracts.]
- o UNION OF SOUTH AFRICA, BUREAU OF CENSUS AND STATISTICS. *Agricultural census 1949-50*, 1952, 6d.
- p *Annual Report of the Vegetable Growers Association of America, Inc., 1951*, 1952, pp. 188, illus. [See separate abstracts.]
- q *Report of Wattle Research Institute, Pietermaritzburg for 1951/52*, 1952, pp. 75.
- r ZÜRICH-OERLIKON (SALZMANN, R.). Bericht über die Tätigkeit der Eidg. Landwirtschaftlichen Versuchsanstalt Zürich-Oerlikon pro 1950/51. (Report of the Zürich-Oerlikon Agricultural Research Station for 1950/51.) *Landw. Jb. Schweiz*, 1953, 67: 1-73, bibl. 20.

